SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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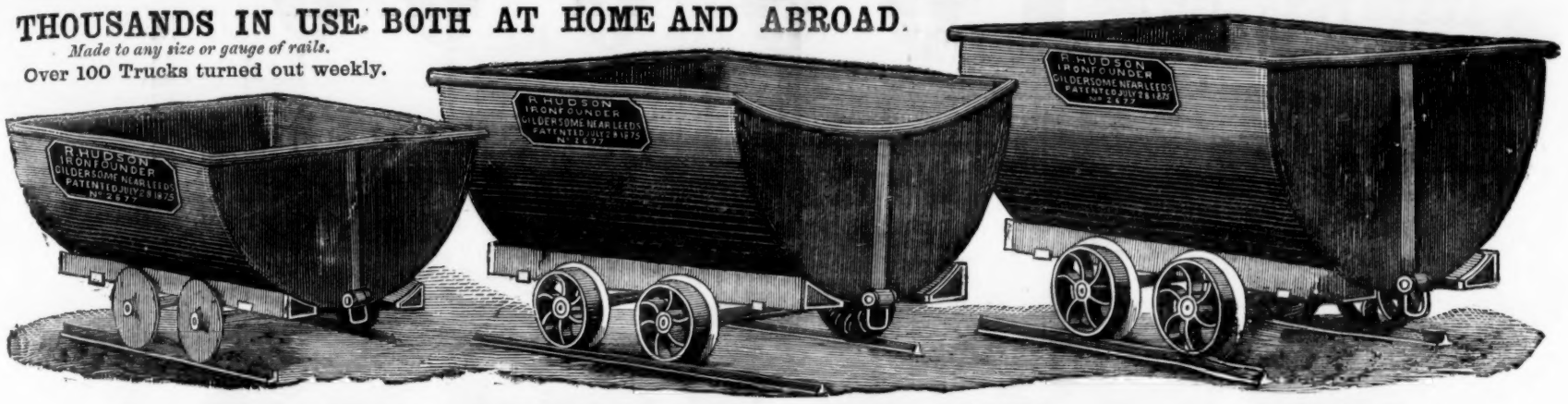

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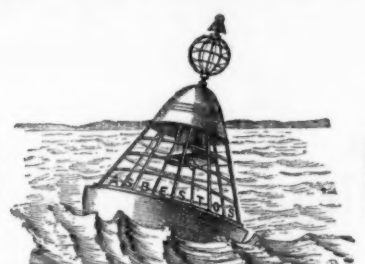

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Mr. J. Bell, Asbestos Works, London.

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I am, Sir, yours truly, J. ASHCROFT, Chief Engineer.

Portsmouth, February 20, 1883.

Mr. John Bell, Asbestos Works, London.

SIR,—Your Asbestos Steam Packing that you have been supplying for some considerable time I can recommend to steam users generally as being the very best that was ever introduced into the market for piston glands, slide throttle and throttle valve glands. I can after considerable experience say that it is the very best that I have ever used. We run our engine at between 80 and 90 revolutions per minute, and I may add that there is no work more trying than saw mill work. Yours truly, WM. HATCHER,

Engineer at Bailey's Steam Saw Mills, Portsmouth.

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The Maxim Weston Electric Company (Limited), 29, Banksde, London, S.E., 4th January, 1883.

Mr. John Bell, 118, Southwark Street, S.E.

DEAR SIR,—In answer to your request, I beg to inform you that I find the thermometer placed 3 feet above the boilers now stands at 93°; before your covering was put on it used to stand at 126°. With regard to the saving in fuel I am unable to speak very accurately, as the boilers were not working long enough before being covered to ascertain the amount of fuel that would be consumed in an ordinary run; but I feel quite justified in saying that we burn less by about 5 cwts. per night than we were doing, and I shall be glad at any time to show the boilers to any one who may wish to see them, as I consider yours the best covering that I have up to the present seen.

Yours faithfully, (Signed) J. H. CUNDALL, Works Manager.

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The engineer of a world-renowned firm writes:—"There is not, nor can there be, any doubt as to the excellence of your Asbestos and Indiarubber Woven Sheeting—as a jointing material it is unrivalled."

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BELL'S ASBESTOS YARN AND SOAPSTONE PACKING,

For Locomotive Engines, Cranes, &c.

The following Testimonial refers to this packing;—

Festiniog Railway, Locomotive Superintendent's Office, Portmadoc, Jan. 13th, 1883.

Mr. John Bell, 118, Southwark-street, S.E.

DEAR SIR,—I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed, better than we expected. We have a locomotive packed with it, and has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting packing. The Asbestos Yarn we find is very useful, and answers admirably.

(Signed) Yours truly, W. WILLIAMS.

BELL'S ASBESTOS ROLLED CLOTH PACKING,

For Marine Engines. Every 10 feet length of the above Packings has a label attached bearing my Trade Mark, without which none is genuine. The following Testimonial refers to the Asbestos Cloth Packing:—

S.S. "NORFOLK," S.W. India Docks, London, February 28th, 1882.

John Bell, ESQ.

SIR,—I have great pleasure in reporting on your Asbestos Cloth Rope Packing which you sent me on trial. I tried it in one of two H.P. Piston Rods, and it ran 90 days without repacking. The other H.P. Piston Rod was packed with a similar form of packing, not composed of Asbestos, and was repacked 10 times during the 90 days. I have recommended it both at Sydney and Melbourne, and shall do my best to take this packing in whatever steamers I may have to do with.

I remain, Sir, yours truly,

W. W. PROPHET, Chief Engineer S.S. "NORFOLK."

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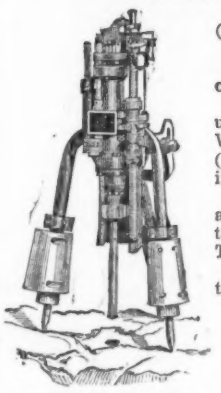

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Original Correspondence.

INDIAN GOLD MINES, AND SHAREHOLDERS' DESPAIR.

SIR,—With regard to the Indian gold mines, I observe that the yields so far obtained are remarkably small, yet very small yields here from 2½ to 3½ dwts. of gold to the ton of quartz are paying public companies dividends. In these mines crushing, hauling, and pumping are all done by steam, and the mines worked entirely through shafts. There are private mines here worked through tunnels; no pumping and no hauling and crushing by water-power, where even as low as 1 dwt. per ton gives profit. Economy in the management I need hardly say in all these cases is reduced to a science. For the information of your readers I subjoin an epitome of the last half-yearly reports, &c., of the Black Horse Company, by which you will observe that 6s. 6d. per share (on 10,000 shares) has been paid out of quartz yielding on the average only 3 dwts. 5 grs. per ton. In the manager's report the number of levels represents hundreds of feet—thus, No. 8, 800 ft. We have one winding engine, one winding and pumping, lowest level 900 ft., and are crushing with 52 stamp heads. I have been a director of this company for some years. We can make 1s. per share dividend per month on 3 dwts. quartz. We have a large poor reef (vein), with first-class system of mining below and above. As the bounding rock to our reef is very soft, we have to fill up closely as we stope, and to do this entails on us as much cost as to break the quartz. At any time I shall be glad to supply you with any information relating to mining in these colonies. Two of our gold mines are lighted by electricity, and others are introducing this light:—

BLACK HORSE UNITED COMPANY.—The report of the directors for the second half of 1882 states that the income of the company for the half-year, inclusive of balance from the previous one, has been 13,041*l.* 17s. 5d.; of this amount 11,245*l.* 19s. 4d. is from the sale of 2801 ozs. 9 dwts. 12 grs. of bar gold. The expenditure has been 12,512*l.* 14s. 10d., leaving a credit balance of 529*l.* 2s. 7d. Among the items of expenditure is 3250*l.* paid in dividends during the six months, equal to 6s. 6d. per share; and considering the very moderate yield of gold per ton of stone crushed, the result may be deemed satisfactory.

The mining manager (Martin Whitford) writes—In No. 3 level we have been stoping regularly on a wide body of stone (eastern stone), having to take the full width on account of its variable quality. We have proved that our present workings are much farther east than any of the workings in the No. 7 level above, and shall have a good width of stone yet to work east of the old stopes in that level. In No. 7 level we are still working on the wide body of stone mentioned in my last report, and by appearances you have some years' work there yet; the quality now is about the same as when last reported on. In No. 6 level we have sunk a winze to connect with No. 7 for filling purposes, and which has also enabled us to open up two additional stopes. North in this level the drive mentioned in my last report has been completed to the No. 1 shaft, and a chamber cut; by this we are enabled to bring the stone from these stopes to No. 1 shaft, which means a saving both in cost of trucking and wear and tear of shoots. Have been stoping over this level during the six months in fairly payable stone, and there is a good body of stone still going north in this part. We have been and are still stoping south in this level, where there is a large area of ground yet unworked; but so far it has proved of a rather low quality, but we believe that when we get higher up it will improve. A winze has been sunk from No. 5 to No. 6 level, which has also given us two fresh stopes. The stopes south in this level (No. 5) have yielded a good quantity of stone of the average quality, and I have much pleasure in informing you that it will take a long time yet to work out this part of the mine.—No. 3: The drive mentioned in my last report has been extended 200 ft.; but I regret having to say that the stone has so far proved to be poor.

During the half-year we have made various trial crushings, the results of which have guided us in our operations. A new winding rope has been purchased and placed on your No. 2 shaft. During the Christmas holidays the battery, engines, and boilers have been thoroughly overhauled, and it was found necessary to have four new plates put in one of the boilers at No. 1 shaft; this has been completed, and your machinery and works are now in an efficient state. We have about 1600 tons of firewood on the ground. Your directors have regularly visited the mine, and given valuable assistance in carrying on operations. Crushed for the half-year, 17,361 tons of stone, which yielded 2801 ozs. 9 dwts. 12 grs. of bar gold.

It will be seen that the directors' fees are but a small item, although I may remark that one-half the directors inspect the mine above and below every fortnight. The Black Horse Mine is situated about 20 miles from Ballarat, and 110 by rail from Melbourne. Fees in some of the Indian mines for the useful work done appear to range very high. Men obtaining large salaries at the mines and on the boards will naturally be afflicted with sanguine views of present and future prospects, and possibly these incomes may warp their judgment, and lead to an unwarranted waste of capital. In the pursuit of my profession here I am occasionally necessitated to discourage further expenditure on forlorn hopes in the shape of gold mines that will not justify further outlay of capital. WILLIAM NICHOLAS.

Exchange, Melbourne, Feb. 21.

THE GOLD AND DIAMOND FIELDS OF SOUTH AFRICA.

SIR,—I am able to write you another letter before leaving for the Transvaal. It will be remembered that I have continually called attention to the fact that unless the detectives directed their attention to the wealthy illicit diamond buyers they would never check the diamond traffic. I am glad to say they have at last made a move in the right direction, and last week a couple of "big fish" were caught with about 11,000 carats in their possession; but this is as nothing compared with what we may expect. There are much bigger fish yet to be caught—persons against whom suspicion has been directed ever since the first discovery of these diamond fields, and who fancy they are diverting suspicion from themselves now by decrying others. I have heard it said that the few chimneys in Kimberley are very valuable, and that the mason-work which surrounds the iron safes often contains more diamonds than the safes themselves. Many persons believe that if some office floors were removed and a plough run through them diamonds would be unearthed by the gallon. The natives do not appear to object to the searching system, but they strongly object to being tortured by being compelled to wear on their naked skin old grain and chaff bags, with oats, ears of corn, and bur-weed sticking all over them. As far as the comfort of the natives is concerned they might as well have a leather suit with tin-tacks driven all over—point inwards. The owners of unprofitable ground could not afford to clothe their blacks properly, and as many of them had large quantities of old grain bags they passed a resolution that an old sack with holes cut for the head and arms was to be the costume of the native. The Central, French, British, and North Block Companies refused to be a party to such cruelties, and provided their blacks with proper clothing. It will show how completely the rich companies are at the mercy of the poor companies when I say they are to be fined by the Mining Board for not subjecting their native servants to the tortures of the prickle sack. The members of the Mining Board who introduced such a barbarous costume ought to be compelled to wear it.

The Mining Board does not improve. They have all but effected the total ruin of this place. They are now in a fix for want of funds, and cannot pay their employees. I maintain that this place will never again be prosperous until the Mining Board is done away with, and every company allowed to stand or fall on its own merits. The Barnato Company has had to suspend operations for want of funds. The Standard Company are in nearly the same fix, and are still swamped with reef. This company's ground is about as good as any in the formation, and yet their 100*l.* shares can be bought for 30*l.*, and it is my opinion they will go lower. The companies hauling diamond soil this week are the Central, French, Gem, Rose Innis, and British. Times are that bad here at present that it is difficult to conceive how they can be worse unless the place collapses altogether. If capitalists cared to invest in diamond mines I have no doubt that during the next six months they could buy diamond mining properties at almost their own price; but I would remind them that any properties under the control of the Mining Board would be dear at a gift.

In the Transvaal things are far worse than they are here notwithstanding their wonderful gold fields. "Observer," in the Transvaal Advertiser, says—"he thought last year that the lowest stage of commercial depression had been reached, but he now perceives that he was greatly mistaken. Anything like the month of February just passed has not been experienced in Pretoria for many years. And the worst is there is no apparent prospect of anything better soon. Trade has fallen away, money has left the country, and how the one is to be revived and the other brought back no one can conceive. Even the stoppage of the war can do little beyond partially arresting our downward progress. And the look-out is so black that one can only sit down and wait for the worst." There is no doubt but that it is somewhat difficult to suggest a remedy for the present state of affairs. At the same time I say most unhesitatingly that if half the money which has been spent in trying to promote swindles had been devoted to a legitimate development of the country things would be in a much better state at present. The gold fields taken in the aggregate are a decided failure. Individual diggers are not earning their salt. But it is said the companies are going to do the proper thing when they have got their machinery. It is nearly two years since some of the gold field concessionaires commenced to exploit the public, always going to do something wonderful, but producing nothing but company-mongers' reports and maps which bear little resemblance to the real geological character of the country, and appear to have been copied from some obsolete educational work. The murder of blacks goes on as usual, and Englishmen are being waylaid and murdered with impunity, consequently I do not think it would be safe for me to go to the Transvaal just at present.

Kimberley, March 8. CORRESPONDENT.

THE NORTH AFRICAN SEA OF SAHARA.

SIR.—Industry and commerce are likely to be so largely benefited by the creation of a great inland sea in the region now occupied by the desert of Sahara that the success of the project is of scarcely less interest in England than in France. There can be no question that as a canal maker Mr. Ferdinand de Lesseps has a deservedly high reputation, but there is a question—assuming, as has been asserted that the desert of Sahara is the bed of an ancient sea—whether the water, when let in, will remain there in a commercially useful condition, since it is not unnaturally asked what could have been the cause of the entire removal of so vast a body of water, and whether such removal was by sinking or by evaporation; if by one or the other, have the causes which operated at the time of the drying up ceased to exist; and whether the sea, when created, will have sufficient motion in it to keep it wholesome, or will be a mere pestilential stagnant pool, breathing death and destruction to the French colonies on the Mediterranean as well as to the inhabitants beyond the desert. The Paris correspondent of the Standard states that the veteran Mr. Ferdinand de Lesseps returned to Paris on Tuesday from a month's tour in Tunis to inspect the route of the canal by which it is proposed to flood the Chotts, and make an immense lake 14 times the size of the Lake of Geneva, and 4½ fms. deep.

The report of the Commission of Contractors, who accompanied Mr. de Lesseps, is decidedly encouraging, since they say that in the course of the explorations which they have just made in the Tunisian and Algerian Chotts, stretching from Gabes to Biskra, they have ascertained the maritime question. The mouth of the Oued Melah, the spot where the entrance to the canal which is to let in the waters of the sea upon the Chotts capable of being inundated, presents at high water a sufficiently large surface of water. It can be easily deepened, and made to constitute a natural port sheltered from all the winds from the north-east, shifting to the south by west. The winds from the north-east, veering to the south by the east, cannot be dangerous when the port is protected against them by a single breakwater. The roadstead in front of the entrance is, moreover, precisely similar to that of Gabes. The navigation of the canal can offer no difficulty, its direction being almost rectilineal. With regard to the safety of vessels in the inland sea itself, it has been easy for the Commission to ascertain for certain that there will be a complete absence of rocks. The bottom of the sea will be everywhere either ooze or marl. The average depth of the water will be 20 metres, so that there will never be any doubt about the safety of any vessel whatever may be its size. Concerning the agricultural results. All the lands situated on what will be the northern shore of the inland sea, and the northern bank of the canal from Gabes to Biskra, for a distance of 500 kilogrammes, are generally of the same nature as the most fertile lands of Algeria and Tunis. All that they require to be transformed into the most productive districts, and to become an immense source of riches and prosperity for the country, is a little water. The modification of the climate which will naturally result from the presence of a very large sheet of water in the basins of the Chotts, together with the utilisation of the subterranean waters, whose presence has been ascertained both by borings and the existence of natural wells, which supply the native tribes with water; and, again, the storing of surface water will incontestably render it possible to restore to cultivation those vast tracts which now lie completely unproductive. In these lands, as well as in the other sources of revenue, such as fishery rights, the right of navigation, &c., will be found a large remuneration for the capital invested in the enterprise.

With regard to the levelling operations made by Commandant Roudaire it has been unanimously acknowledged they they were performed with the minutest care, and by an infallible method, and that they are absolutely correct. Concerning the execution of the works, it has been ascertained that the soil which will be met with will be very easily removed, and that mechanical appliances will be able to be employed in its removal. The calcareous rocks met with by M. Roudaire in the course of the borings he made in 1879 at the base of the hill close to Gabes, and whose volume is relatively insignificant, constitute at the entrance of the canal an advantage rather than an inconvenience. They will, in fact, furnish the necessary materials for the construction of the breakwater and the port. They may also prove useful, if it is found necessary, to establish a sluice at the entrance of the canal by means of which the introduction of the water could be regulated during the filling of the inland sea. The course of the canal across the Djerid Chott follows the northern bank, so as to avoid the oozy ground of the central portion of the Chott at the spot which separates the Djerid Chott from the Rharsa Chott. The new course at Tozeur, recently studied by Commandant Roudaire, completely avoids the rocks at Kriz, whose volume had been estimated by the Superior Commission at 25,000,000 cubic metres. The altitude of the new passage is, moreover, 12 metres less than that of Kriz. The borings made at the highest point of the new course of the canal have demonstrated that nothing but sand will be met with. The nature of the ground to be traversed by the canal makes it evident that it will suffice to cut a canal through the alluvial soil, measuring on an average 25 or 30 metres, which will be increased by the force of the current itself. To cut that canal will require at most five years, and its cost may be estimated at about 6,000,000*l.* Compared with the Anglo-French Channel Tunnel, I think it will be admitted that the African sea project offers a far better chance of proving remunerative.

City, April 12. ABD-EL-KADER.

CHONTALES, AND ITS PROSPECTS.

SIR,—The report expected from the Chontales Mines probably will appear in the *Mining Journal* of April 14, and will give the result of ore crushed for a portion of the month of February; it being the dry season for the next month or two we must not expect that a large quantity of ore will be treated, what to us as shareholders is importance is the quantity of gold per ton produced. It is about 13 years since the Consuelo Mine was worked; there has not been a large quantity of ore treated, between 6000 and 7000 tons, which gave an average of 13 dwts. per ton. It has been reached by a deep level, and will make available a large amount of ore including several fathoms of backs. From 1868 to 1880 the ore raised at the Chontales Mines has averaged 4½ dwts. per ton, and why we have not had dividends is in consequence of the very heavy expenditure; the costs of 1868 were $12·52 a ton under Mr. Belt's management, which has been reduced under Mr. White to $3 a ton. Mr. Belt's report for 13 months ending June, 1872, under the head of costs—salaries of wages to Englishmen, 3581*l.* 10s. 10d., Mr. Belt himself being paid 1100*l.* for his salary. If the shareholders refer to Mr. White's annual report for 12 months ending June, 1878, salaries and wages of Englishmen they will find 1121*l.* 1s. 8d.

The shareholders having had their additional capital spent in driving the level in the Consuelo Mine, the ore of which has produced such good returns, it is to be hoped that the directors will see the necessity of economy in the future workings as far as is prudent at the mines and in the home expenses; had there been economy at the starting of the mines the yield that has been produced ought to have given continuous dividends. What is wanted on the part of the shareholders is that they should take more interest in the welfare of the company than they hitherto have done—those who attend the meetings at the Chontales office find on such important occasions as the half-yearly meeting that the room in which they are held is all but deserted. WILLIAM BALL PALMER.

All Saint's-lane, April 11.

THE LATE RISE IN NEW EMMA SILVER SHARES.

SIR,—Excellent reports continue to be received from the manager of the New Emma Silver Mine at Alta, Utah, U.S.A. The new shaft is nearly completed to the point where the level will be run on the rich ore ground. Any day a telegram may announce that the bonanza has been struck, and, perhaps, we may see Emmas at a much higher price. The recent discoveries in the Vellejo Mine have incited the Emma directors to renewed exertions. Where the Emma Mine is located is a splendid mining district—the richest in Utah. On a hill, or mountain, soaring into the heavens, and hundreds of feet above the valleys, are four noted Utah silver mines. This mountain is cut for the purposes of mining into four parts. First, there is the Emma Mine, next the celebrated Vellejo, third the Flagstaff, and fourth the Eclipse. In the Vellejo Mine has recently been struck one of the mining prizes of Utah—in the form of a bonanza of rich silver ore. To give the public an idea of the richness of this ore, I may say that it shows 400 ozs. of silver to the ton, while the lead itself more than pays the cost of working the mine. Experts who have been in the Vellejo Mine say that this rich bonanza extends into the Emma and Flagstaff Mines. The New Emma Company are sinking their new shaft for the purpose of cutting this bonanza, and in the Flagstaff Prof. Vincent—to whom all praise is due for his pluck in standing at the helm of the Flagstaff for so many years—says the rich ore ground will be met with in the 7th level. I do not know at any period in the history of the Utah mines when the Emma and Flagstaff Mines looked so promising. J. J.

MINERAL WEALTH OF MEXICO.

SIR,—Having lately returned from Durango, where I have had ample opportunity to examine various mining properties, I propose to send you descriptions of several, so that your readers may have some idea of the opportunities waiting in Mexico for skill and capital. Commencing with the Candelaria Mine and mill situated at Vera Cruz or Metalis, a point on the western slope of the Sierra Madre mountains, in the State of Durango, about 200 miles south-west by south of Parral. It contains about 1000 people of whom nearly all the working force are employed in or about the mine or mill. The mine is situated on the east side of the Metalis river, and the mill immediately opposite on the west side. It occurs in a mountain of the form of a sugar loaf, which gives it almost unparalleled facilities for economical working by means of tunnels. Of these there are three, two being driven on the vein, and the third or lower being a cross-cut, and has yet some 150 ft. to be driven (estimated to cost $3000) to cut the vein. The height of this mountain is some 3600 ft. above the river level; the lower tunnel now being driven will cut the vein some 1500 ft. below the outcrop, while 500 ft. still lower there is another good tunnel site, and a tunnel can be driven from the river level, or 3600 ft. below the outcrop. There are two principal veins running north to south, dipping slightly west, and these are intersected by various veins running east to west, which at the points of junction form large bonanzas of rich ores. The workings are nearly 1200 ft. deep, and at the bottom are in ore 13 to 15 ft. wide, running over 30 per cent. copper, 150 ozs. silver, and $20 gold per ton. The upper workings are in ore of lower average value, over 20 per cent. copper, and 100 ozs. silver per ton. All through the mine are large bodies of rich ores running from $500 to $1500 silver per ton, while the average vein matter is as just stated. Last week there arrived in Parral from this mine for sale concentrates and ores which sold on the following assays:—Concentrates, $12·331 silver per ton; copper ore, $1·409 silver per ton. No allowance was made for the gold or copper.

On the completion to the vein of the lower tunnel a block of vein matter practically virgin will be laid open 800 by 1500 by 13 ft. = over 1,000,000 tons of ore, which it is safe to say will net over $100 a ton, or a total value of $100,000,000. When this tunnel is completed the ores can be mined and put in mill for less than $5 per ton, while their cost of smelting into matte will not exceed $10 to $12 a ton in suitable water-jacket furnaces working 50 tons each daily, making a total cost of $15 to $17 a ton. The present costs of ores from the upper works are $25 per ton. It is safe to say that from this mine, when properly equipped, copper can be laid down in New York or London for 5 cents per pound, and that the copper in its ores will overpay all the costs of the mine, mill, freights, and charges, leaving the silver and gold free to the owners.

The mine is sufficiently open to permit a daily extraction of 100 tons of ore as soon as the tunnel is completed and the water-jacket smelters are ready to take care of that quantity. The present owner has spent the last six months and $42,000 in opening and clearing the mine, running lower tunnel, and enlarging and improving the mill. This is driven by water-power, of which there is plenty not only to drive a large mill but to drive air-drills in the mine whenever compressors are supplied. The power is made available by one overshot water-wheel 34 ft. in diameter, and another overshot 36 ft. in diameter 6 ft. breast has been commenced. A water-jacket smelter is now in course of construction. Hitherto the method of treating the ores has been grinding, concentration, and lixiviation, but it is believed that smelting into matte and shipment of it to Europe will be better, more economical, and permit a larger daily output. The former owners shipped large lots of ore to Europe, which, as a matter of record, netted them at the mine over $7,000,000, the nett proceeds at the mine of each shipment having been over $500 per ton after deducting all costs, freights to Europe, charges and commissions. No one can tell what is in the ground unseen, but with a mine proven 1200 ft. deep, and with its unequalled approaches, it is evident this will shortly be one of the famous mines of the world. More anon.—*Parral, Mexico, March* 19. GEORGE WILSON.

ROCK-BORING MACHINERY—TUNNELLING AND INDUSTRIAL MINING.

SIR,—Thinking it may not yet be sufficiently well known, we ask your permission to state that the driving of the advance heading of the St. Gothard Tunnel was of exactly the same character as the driving of any long adit or level, and to obtain the same result of speed it is only necessary that the same means should be employed—*i.e.*, to use the machinery applicable, and to drive the adit large enough to give sufficient clearage. The great question at the St. Gothard Tunnel was to drive the advance heading of whatever size would allow of its being pushed on most rapidly, and a section of 2½ × 2½ metres (about 7 ft. 6 in. × 7 ft. 6 in.) was found to answer best. The London and North-Western Railway Company also used our machines of this class in the headings of two shafts without inconvenience.

With reference to our machines, Mr. Maury, the engineer-in-chief, stated in Le Génie Civil of May and June, 1882, that at the south side of the St. Gothard Tunnel the two small pistons which form the valve of the Ferroux machine soon wear, and allow the air to escape. On the contrary, no loss arises from the wear of the valve in the MacKean drill; the compressed air constantly presses the valve to its seat, and as the valve can move on the rod which carries it the contact of the two parts are always perfect, and the wear which they produce one upon the other only serves to make the contact the more perfect. In this connection we may mention that, while our machine has only one piston, the Ferroux machine, which was used for the north side of the tunnel, contained no less than six pistons.

Another fact which has its significance. In January, 1879, Mr. Hersent, the late contractor for the works of the Danube, and at present contractor for the Panama Canal, ordered a machine of our system for deepening the harbour of Brest, in a bell of his own construction, at a pressure of one to two atmospheres, this pressure being produced simply by the immersion of the bell, and maintained in equilibrium by an air-pump placed on shore, or on a barge alongside of the bell, the machine to be used without any conducting tubing other than for the exhaust. Mr. Hersent stated to us that he had used boring-machines for other purposes, but that for this special work he had made trials with them with the pressure at which he required

them to work, and that he had found that none of the machines he had formerly used would move under such conditions.

Paris, April 11. MACKEAN AND CO.

MINING IN IRELAND.

SIR,—I was somewhat interested with a letter written in your paper a short time ago by Mr. Thomas Tonkin, M.E., and thought someone would give some more information relating to what has been done in the various mines which have been worked at various periods ere this; also giving an account of mines (if any) which are now worked in Ireland. The Brow Head Mine mentioned by Mr. Tonkin lies immediately north of Brow Head, which is the cape at the south-east of Barley Cove. The lode there is about 10 ft. thick, and contains grey, purple, yellow, and peacock copper ore, and at the depth of 30 fathoms it changed into good yellow stone. It hades north-east at 43°, and a shaft has been driven down the lode for 60 fathoms, proving it for a perpendicular depth of 30 fathoms, or 20 fathoms below the adit level. This mine, if judiciously managed, would soon pay a good dividend. The Crookhaven Mine is not far from the Brow Head Mine, and is situated a little on the east of the village of Crookhaven, and in it four lodes have been worked and are called by the following names—1st, purple lode, purple copper; 2nd, gossan lode, yellow copper at the depth of 40 fathoms; 3rd, quarry lode, yellow and purple copper; 4th, champion lode, yellow copper in quartz vein. No. 1, or purple lode, lies on the sea shore, half-a-mile due east of the village of Crookhaven. It hades or underlies north-west at about 50°. This seems to be a bed of killas, full of small veins of quartz that contain ore. No. 2, or gossan lode, is highly calcareous; in places it has the appearance of a breccia, and in others it is stained with green carbonate of copper. No. 3, or quarry lode, is a bed of killas, with small veins and strings of quartz. Nos. 2 and 3 hade similarly to No. 1. No. 4, or champion lode, is a regular quartz lode, which is very large at the surface; but towards the south-west, as seen in the cliffs due south of Rock View, it divides in depth into strings. The lode at the engine-shaft has been proved for 40 fathoms in depth, and for 20 fathoms it hades a little to the south. The lode seems to continue towards the east to the sea. The works used to be carried on by means of an engine shaft which has been sunk on the champion lode. From this they have driven forwards to the south to cut the other lodes. There have been five other lodes discovered on the north of the engine-shaft; but as they all hade northward at a similar dip to those already mentioned, they are more likely to be beds than regular lodes. There are 27 mines in the county of Cork which have been worked at various periods, and from which copper, lead and manganese of a high percentage has been obtained, clearly demonstrating that investors need not go abroad while there is such a large field for speculation at home. T. H. PENROSE.

Eastwood, Notts, April 11.

IRISH INDUSTRIES—UTILISATION OF PEAT.

SIR,—Although almost innumerable processes have been from time to time brought forward for the utilisation of peat as fuel, the success obtained has been very incomplete, and in many cases the expenditure of large amounts of capital has resulted only in failure; it is, therefore, satisfactory to learn that, applied to another purpose, not only can the utilisation of peat be made commercially remunerative, but precisely those portions of the peat which have hitherto given the greatest trouble are found to be the most useful—the fibrous portions In a monograph entitled Fibrous Peat as a Paper-making Material and an Article of Commerce (Newcastle-on-Tyne: H. Nixon) Mr. J. A. London, who has had 20 years' experience in the paper trade, gives details of the process which he employes, and annexed a sample of thin self-coloured brown uncalendered paper which contains no less than 30 per cent. of fibrous peat. The contrast of the peat paper to the ordinary loaded browns now largely in the market is striking, and leaves no doubt that, as a paper-making material, peat is vastly superior to Portland cement; indeed, the peat fibre appears to be really a substitute and not a mere adulterant of the bagging or rags of which the best packing papers are supposed to be made. Mr. London remarks that we have to procure the bulk of the raw material from abroad, and that almost all classes of it are yearly advancing heavily in price. The supply of old rope has diminished through the introduction of wire rope, and similar causes affect other raw materials formerly available. Esparto as a material for the manufacture of writing and printing paper, of which the annual imports are something enormous, is threatened with extinction. The cost has of late years enormously increased and following the law of supply and demand, the demand exceeding the supply. The economical use of straw and wood pulp is in practical use by paper-makers, of a doubtful economical character, owing to their small yield of fibre, and many other substitutes for rags have signally failed as a material that can be generally and largely used.

The supply of peat in Ireland is practically inexhaustible. It is estimated that one-seventh of the entire surface of the country consists of peat bogs, which cover no less than 2,830,000 acres. Of this 1,576,000 acres are level bogs, and 1,254,000 acres are mountain bog, so that the importance to Ireland of giving peat a fair commercial value can be readily estimated. For the purposes of Mr. London's invention preference is given to the peat from the upper part of the bog, but below the surface layer. Assuming first that the material obtained from such peat is to be used for the manufacture of ordinary brown paper, the fibrous peat is taken and washed sufficiently long to remove earthy and other impurities, and the cleaned fibres are then treated with a hot solution of caustic or other alkali, preferably soda, for the purpose of dissolving in the ordinary well-understood way, and getting rid, if desired, of resinous and gummy matters which may be present, and thus rendering the fibres soft and pliable. The fibres are then washed in order to remove the alkali, and are used in combination with the other materials ordinarily used in the manufacture of brown paper in the manner hereinafter described. Such materials as are so ordinarily used consist of from 20 to 30 per cent. of china-clay or other analogous mineral, and 70 to 75 per cent. of the fibre of old hemp, rope, bagging, or other articles manufactured principally of hemp, jute, or analogous material. Where the fibre of peat is to be utilised, according to this invention, 20 to 50 per cent. of the peat fibre prepared and treated as described, is combined with 50 to 80 per cent. of hemp fibre of the kind mentioned, without the addition of china-clay or other mineral substance. In this way, and by the omission of the china-clay, a paper is obtained which, though of not too great a weight, has sufficient substance, handles well, and is of valuable quality. Tannic acid being one of the constituents of peat fibre, the latter, when prepared and used in the manner and in about the proportion described, gives a good colour to the brown paper made with it, and where it is necessary to use salt water in the manufacture of paper such tannic acid neutralises the salt to a greater or less extent, and prevents or lessens its injurious effect upon the steam-boilers or other implements used in the manufacture. The peat fibre, prepared as above described, may be dyed purple, blue, or any other colour which it is desired that the finished paper should have.

It need scarcely be stated that, by such a method of utilising the peat fibre, great economy is effected, not only in the great relative cheapness of such fibre as compared with the fibrous materials ordinarily used, but from the saving which is also effected (when the peat fibre is of the necessary character and properly prepared) in the use of other of the materials or ingredients ordinarily used. For instance, alum is ordinarily used in considerable quantity for the purpose of hardening and tending to render insoluble the gelatinous or other size which is added to the materials for the purpose of giving strength to the paper. By this invention, where peat fibre is used, especially for brown papers, the tannin or tannic acid contained in the colouring matter of the peat, not being removed, has a similar effect upon the gelatinous or other size, and much or all of the alum may consequently be omitted. For this reason the proportion of size mixed with the materials may be considerably increased, with a corresponding advantage in the strength and appearance of the paper, but without corresponding increase in cost. It will be seen, therefore, that the object of the improved method of treating and utilising peat fibre in the manufacture of paper is not the substitution of such fibre for the fibrous materials ordinarily used, but the method of treating and utilising it, so that it can be used, by the careful retention of its essential ingredients, as a substitute for the mineral substances, china-clay, alum, and the like, which are ordinarily used in the manufacture of paper, the result of such substitution being reduction in cost, and improvement in the quality, appearance, and durability of the paper. In cases where, instead of brown paper, it is desired to manufacture paper, more or less white, by the improved process, the inventor substitutes peat fibre prepared as described so as to retain sufficient of its astringent properties, and bleached to a greater or less degree by means of chlorine or other well-known means for the wood pulp, straw, or other fibrous substances ordinarily used in the manufacture of such paper which do not possess the astringent properties necessary for the purposes described, and paper so made is both cheaper and stronger, as well as free from the mineral substances for which the peat fibre provides a substitute, and consequently lighter, more durable, and less liable to deterioration.

Although, thus far, it has been assumed that the peat fibre would only be applied to the manufacture of ordinary packing paper it must not be supposed that it is applicable to this alone, since it is equally valuable for the manufacture of papier-maché, boiler-jacketing, linoleum, and so on. It appears that manufacturers could rely upon a regular supply of clean, fresh, sweet, prepared compressd peat fibre, ready for manufacture, in bales at 5*l.* per ton, or less than half the price of the finest coil rope. Bagging, and other hempen materials, need not be taken into the question, although the price is from 6*l.* to 7*l.* 10s. per ton, yet on account of the dirt and moisture it requires nearly 2 tons to make 1 ton of paper. It is stated among other things that peat fibre compressed and treated will produce an excellent and cheap article, also an admirable carpet felting when properly prepared, from it can also be produced an excellent stuffing material for upholsterers' work, whilst cheaper kinds can be supplied for packing china, earthenwere, glass, and other things, as a substitute for straw, so that after all the disappointment which has been experienced in the attempts to utilise peat it would seem that at last the true solution of the problem has been discovered, and it may be hoped that Mr. London will obtain the reward he is so fully entitled to for his ingenuity.—*Newcastle-on-Tyne, April* 4. ERIN.

THE GANLLWYD GOLD MINES, NORTH WALES.

SIR,—In consequence of the reports circulated about the gold found in the district in which these mines are situated, I made it my business to ascertain whether matters were really as represented, and called on Capt. Evans, who is making an experimental trial on the side of the River Mawddach, and was very much pleased with the economical way in which he is extracting the gold. I went up to the mine, where I saw in the rock an extraordinary quantity of visible gold in several places for about 8 fathoms on the surface, and I have no hesitation in saying that it will well repay—I should say it ought to pay 25 per cent. I was an eyewitness of the value of the property, and do not doubt that it will be heard of again as soon as Capt. Evans's experiments are completed. I do not see why English capitalists should send to work foreign gold mines when they have *bona fide* mines producing the same metal at home. R. W.

Dolgelly, April 11.

MINING PROSPECTUSES, LORDS' DUES, COVENANTS, AND PREMIUMS.

SIR,—My absence from Cornwall has prevented my aid being given to those who have so deliberately and tenaciously been pressed upon by some of the Cornish lords. I refer chiefly to Dolcoath and South Caradon; the former is, as I am informed, settled by an almost immediate payment agreed on of 25,000*l.* for the renewal of lease, with the same imposition of dues, covenants, &c.—*i.e.*, if the present lord is living at the expiration of the present lease, some four and a-half years hence. Surely the managing committee, whomsover they may be, must have had some incentive other than the interest of mining in general, or they could not so foolishly have pledged the present shareholders to such a dangerous precedent. Still it is refreshing that there were some few at the meeting who were not so deeply steeped in landlordism to consent to such oppressive dealings. Moreover, as I am informed through the local press, that one of these gent'emen (as that most liberal lord would call stubborn) has pledged his word to seek legislation for the more equitable arrangements of grants and powers for the more adequate development of the resources of the county, and such would include perhaps not the county only but the whole United Kingdom. I heartily hope he will find the present Cornish members and others of Parliament not stubborn, but in accord with his ideas, and ready to take up the cause of right against, as the lords assumed, might. The population of the county has been continually for the last ten years or more decreasing, and is it any wonder when so much capital is drawn up into the coffers of the few, extorted, as it were, from the English speculators, whose characteristics are known to be generous to develope the resources of the county to the benefit of the great mining population in general and a fair percentage for their outlay.

It has not unfrequently been stated by those liberal lords and perhaps others that the numberless failures in Cornwall can be attributed to promoters and others more intimately connected with the management. What say the public to this indictment, with such glaring and undeniable facts as these? One question more—Would it not be fair for the lord to allow a fair interest for the 25,000*l.* during these four and a-half years out of the dues which he expects to receive? If this were done it would perhaps during that time increase the dividends a little, but if not a great many of the present shareholders will suffer the full loss on the depreciation in value of shares. This, I admit, may be considered by the lord sharp practice only, but what about its honour man to man? I presume not for the present to speak on South Caradon, as I am informed that negociations are still proceeding, but I trust the example of the Dolcoath shareholders will not be copied by the more astute men connected with this mine. My attention has lately been called to several prospectuses issued, some privately, others to the public of foreign mines, and as I have been informed liberally responded to, whilst others of the United Kingdom have suffered complete oblivion. The former been granted on the most liberal terms, long leases not handicapped with covenants of money deposits, dead rent, surface damage, continuous working, forfeiture and such like, but in most cases not unlike copyhold estates; one of these has more particularly struck my attention. The company's property is situate somewhere in Tuscany, consisting of 1000 acres or more, and respectably reported on.

The reports are from personal observation and survey of an English reporter on mines, who gives details of various lodes of copper, silver-lead, and zinc, and most elaborately worked out in figures, showing at a glance the net profit which can be made on the capital employed. This report was also verified by the late Mr. Geo. Henwood, and worked out in detail such as seldom presented to the public. I observe from the Memorandum of Association that this company is formed to carry on the business of a mining, smelting, trading, and metallurgical works in all its branches. The lodes are of enormous size, and can be worked a great depth without that most expensive operation in most places of pumping and hauling through upright shafts, this being obviated from a series of hills rising from 200 ft. to 600 ft. above the sea level. I further observe that a very long lease has been granted at a low royalty free from dead rent, and of such surface land as may be required, free from any charge whatever, thereby showing that confidence in which all such speculations should be accompanied by the lord to enlist and encourage the investor in what may be termed an honest commercial transaction. Now who can wonder that English capital finds its way into channels like unto this in preference to Cornish mines and others of the United Kingdom so handicapped by the lords? This prospectus I understand will shortly be made public through the medium of the *Mining Journal*. The geological and mineralogical capabilities of the property seem to me to be such as to warrant satisfactory results upon either a nominal or extensive outlay, and I have no doubt the public will when an opportunity presents itself respond most promptly to the call given them to subscribe to an undertaking so honestly, faithfully, and legitimately promoted in all its bearings.

Plymouth, April 5. B. S

EAST WHEAL ROSE.

SIR,—I observe in the *Mining Journal* a reference made to the north part of this celebrated mine, and that home capitalists are contemplating to purchase this part. I, for one, cannot believe this to be true, as the present holders of East Wheal Rose know well that they have a world of wealth in this ground; but, be this as it may, I would remark that if such be the case the parties, if they purchase this part of East Wheal Rose, should at once secure the Newlyn United Mines direct to the north, and which adjoin East Wheal Rose north boundary. This mine is in almost virgin ground, and the rich lodes of East Wheal Rose pass through the Newlyn United sett—that is to say, Middleton's and the east lodes. These lodes having returned such enormous wealth, and seeing that their levels are driven north to within the short distance of 60 or 70 fms. of the Newlyn United boundary, it speaks volumes for the great riches in Newlyn United. These setts are very large, being three different estates. A shaft has been sunk 20 fms.; this is a capital engine-shaft, and a cross-cut is driven west towards the East Wheal Rose lodes, but the old workers failed to reach the lodes for want of capital, and there only now remains about 25 fms. to reach this grand object. An adit level is being driven east 125 fms. in virgin ground, in doing which no less than six fine lodes have been cut, all of the very greatest promise, producing mundic plenty, small quantities of blende and lead ores, at the very shallow depth of 10 fms. These lodes are large and full of promise, and leads everyone that has inspected them to say that it is only a matter of a few fathoms deeper to cut into rich courses of lead ore. One of these east and west lodes has just been cross-cutted through, and from wall to wall it is 20 ft. wide—a splendid looking lode, and one that cannot fail to become vastly rich at a deeper point. A cross-cut from the engine-shaft will come in 20 fms. deeper than the adit level. When all these lodes are cut at that depth—about 30 fms.—there is not the least doubt but that another East Wheal Rose will be found for richness.

I may here say that these six lodes named above, and which have been cut in driving the adit level, have never been seen in East Wheal Rose, and one entirely new lode that has never been seen in this great lead-bearing district. Here is a mine of wealth, which can be had for a small outlay, and no time should be lost in securing this property. East Wheal Rose directors should at once take this property, as their engines will be certain to drain Newlyn United Mines. Already their ends will do this. As for their mine here is one of the best chances I ever saw for a company. If any parties wish to inspect this property I court as many as like to come, and will treat for the sale of these mines with any who may wish to embark in the enterprise. JOHN PHILLIPS.

Grampound, April 12.

THE CALLINGTON DISTRICT, AND ITS MINES.

SIR,—As the length of days increase so the future of many of the mines in this district improves. I have just returned from Holmbush and Redmoor; at the latter mine I see they have drawn a very nice pile of silver-lead to surface from the 125 fm. level. They are also dressing their tinstuff. I see they have some very good work for tin; they are burning the arsenic out of it previous to its going to the stamps. The dressing-floors are nearly completed, and everything appears to be laid out with the greatest skill and care, and of the newest principle, and the pumping and drawing engines are working admirably. From the information I got from the officers is the scarcity of good miners to work on the different lodes, so as to keep all their dressing appliances in full motion, when there is no doubt the mine will soon be in the Dividend-list. Holmbush Mine is under the same management, and is laid out with plant second to none in the whole district—in fact, it is superior to any within many miles. I see they are getting a good pile of silver-lead ore, in addition to their copper and arsenical mundic, at the surface. They commenced to work their patent jiggers yesterday quite satisfactorily; and there is no second opinion in this district respecting the future of these two mines, especially as the dressing will be carried out for at least one-half of the cost of the former working of these mines. I hear from good authority they have an important improvement in Wheal Langford in the bottom end west; but an improvement any minute will not surprise the natives much, as it is a well-known fact that there has been many thousand pounds worth of silver and copper ores returned from this mine, although there was nothing done below the 40 fm. level—in fact, the levels have not been extended far in any direction, and the improvement just named is 10 fms. deeper than ever seen by the former company; consequently, it is reasonable to believe the lodes will be productive in deeper levels as it was in the shallower levels. They have also a splendid lot of machinery on the mine working quite satisfactory. I would advise all intending purchasers to get their shares as early as possible, as I believe they will be at a very great premium ere long. I spoke last week respecting the improvement in the Lusky Mine. I am pleased to say the lode is still improving every foot they drive. This is a parallel lode with South Caradon, but some distance north. From the South Caradon adit there were thousands of pounds worth of copper ore returned. The first engine was erected from profits returned from the adit level, and the engine-shaft sunk some distance. The Wheal Lusky is in precisely the same kind of granite, the hill rising much faster, and the lode improving every foot they drive (6 ft. wide), and there is a splendid elvan cross-course just ahead that will be a very great advantage to cross-cut out to intersect any other lodes These shares are now much sought after. I think the early purchasers will have much the best of it. JOHN BUCKINGHAM.

Callington, April 5.

ST. BLAZEY MINING DISTRICT.

SIR,—I was much pleased to see in last week's Journal a prospectus of the St. Blazey Great United Tin and Copper Mining Company, and to notice that these very extensive grants were in the hands of a company which bids fair to become one of the most successful for many years. The registered capital of the company will be ample for very extensive operation, and will probably not be required to be called up. The lodes on the northern portion of the grants being open an outlay of about 5000*l.* only will enable the company doubtless to return from 10 to 12 tons of black tin monthly at good profits. The sinking of the shaft on the great flat lode may be looked upon as a certain means of opening continuous rich ground, not only that produced from this lode, but also from many others which are falling into it very early, and large returns may be relied on from this part of the mine, these lodes being undoubtedly those of Fowey Consols. There is quite 10,000*l.* worth of available work done here for the new company, and by the adoption of the boring machine, and other greatly improved appliances in mining work, with efficient management (which is provided), had there been no other feature of promise; this alone would justify a spirited working, and investors might rely on large and very profitable returns for their outlay.

The opening up of some of the tin and copper lodes further south and near Par Consols can be quickly and cheaply done, and may any day enhance the value of the mine by thousands of pounds, or perhaps tens of thousands, when it is remembered that Par Consols paid a quarter million sterling dividends with an outlay of less than 1000*l.*, the stratification being the same such results may be expected. The lodes of Wheal Eliza on the west, too, and all traversing their grants, and from these equally good results may be expected, as are now being realised from that mine. There is doubtless millions sterling worth of mineral in the property, and its vigorous working will open a field of industry greatly beneficial to the neighbourhood, and profitable to its proprietors. I understand the directors intend issuing only two-thirds of the shares at present, believing this amount to be ample provision of capital. I know of no concern introduced on easier terms or of greater promise, and feel that the undertaking may be regarded as an investment rather than a speculation. The statements made in the prospectus are doubtless correct, and one feeling with regard to the great value of the property only prevails. The present

company regard as exceptional in many of its features, and hope that a few days may only elapse before the mines will be fully in work.

Stoke Newington, April 12. T. Vosper.

EAST BOTALLACK MINE.

Sir,—I have been much pleased with a visit I made last week to the young and promising East Botallack Tin Mine, and had the privilege of going underground and of inspecting the recently discovered Balleswidden lode. The sett is surrounded by the Botallack, Levant, Wheal Owles Mines and others, which have given large profits, and it immediately adjoins the old and extensive Balleswidden Mine, which is said to have returned 800,000*l.* worth of tin. The productive mines of the district have attained a considerable depth, and it is therefore to the younger and shallower mines, more easily worked, that adventurers will have to turn for large profits. It has moreover, I understand, been the case in this district at least, that the largest profits have been made at comparatively shallow depths, as in the case of Levant, where the original outlay was, I believe, only 400*l.*, and which gave returns of over 1,000,000*l.* sterling. At the East Botallack Mine a shaft is now being sunk on one of the Balleswidden lodes. This shaft is at present down only 8 fathoms, but even at this depth the ends now being driven east and west in whole ground are worth 1 cwt. of tin per fathom, whilst the ground is being driven at a very small cost. The progress of this mine is being watched with great interest, and if I mistake not it will prove one of the successes of 1883. Viator.

GOLD MINING, AND ITS MANAGEMENT.

By Thomas Cornish, M.E. (late of Australia).

Author of "Gold Mining: its Results and its Requirements." "Our Gold Supply: its effects on Finance, Trade, Commerce, and Industries, &c."

The question of gold mining and its management is now occupying a large share of public attention not only from disappointed shareholders in the mismanaged ventures that have within the last few years been brought before the public; but an appeal has been made to Parliament to have the history of the starting of the furore in Indian gold mining enquired into, with of course the natural result that nobody is to blame except those who have invested their hard coin in exchange for paper representing specified interests in certain sections of (in many instances) wild forest country supposed to be auriferous. It is not by a system of grandmotherly legislation or Government interference that will cause gold mining and its management to be conducted on a basis of common sense, intelligence, economy, and honesty. Gold mining, although comparatively speaking a new industry in so far that as it relates to an established and well-recognised occupation of a large section of the most enterprising men of the world who pushed forth into the wilds of America and Australia to develope the riches of the earth accidentally discovered, is an industry the practical and scientific knowledge of which has had to be acquired by experience and intelligent application, and it is only those who have passed through the various phases of gold mining either in Australia or America and practically acquired their knowledge, where such knowledge only can be acquired, that can with any degree of confidence be safely intrusted with the expenditure of capital and labour for the economical development of gold mines.

Gold mining is a special business, and requires special knowledge and aptitude for its guidance. What would be thought of the manufacturer of woollen goods who employed for his manager one who had been brought up in the iron trade—would it be any wonder if he and his business soon came to grief? And so is it with gold mining companies whose aspirations are controlled by inexperienced persons. They commence with a blunder, and keep on blundering until they gain experience at the expense of the unfortunate shareholders. By that time the mining operations have been muddled, and the capital frittered and wasted away, the shareholders become disheartened with their losses, and consequently disgusted with their efforts at gold mining. Thus it is, in consequence of inexperienced persons undertaking the control of an industry of which they know nothing, and refusing to be guided by the dictates of common sense and the opinions of men who have an established reputation as experienced and practical authorities, that large sums of money become recklessly squandered in futile and spasmodic efforts at gold mining, which, being lost to the investor, creates distrust, and causes a stigma to be cast upon the industry. Gold mining is of itself not only one of the most useful, honest, and legitimate occupations which a man can follow, but it is the most profitable business in which capital can be judiciously invested, as can be shown by investigation. No other kind of occupation has given such wonderful results from its operations, either as direct profits to the producers of the gold, or the immediate benefits conferred upon all classes who come within the influence of the results of its production, or that is at present paying such enormous profits upon the capital economically invested in gold mining, or that holds out such brilliant prospects for the future as can be obtained by the investment of capital in well-devised and judiciously selected undertakings.

That there has been much capital and labour lost in legitimate gold mining, or in prospecting for gold I readily admit, and know by experience; but the greatest amount of losses of capital in connection with mining is by gambling or speculation in high-priced stock, paying fabulous sums of money for the right of prospecting for gold, misdirected labour, and extravagant management. This has been fully exemplified both in America and Australia, where practical knowledge has been best obtained in those schools of experience. From having been one of the early pioneers of gold mining in Victoria, Australia, since 1854, and gained a practical experience of the various phases of gold mining and its management on Ballarat, the most renowned gold field of the world, and having taken an active part in the development of the mining industry in that district and other parts of Australia, as also having visited some of the principal American and African gold fields, I may, perhaps, be allowed to have had considerable experience on the subject, and, I trust, be able to offer a few remarks and comments on the development of what may be considered one of the most important industries of the present day that will not altogether be uninteresting or unprofitable to those whose interest is that of the legitimate and profitable development of gold mining.

Gold mining may be classed under three headings—quartz, or lode mining; alluvial leads, or gutters mining; and surface, or placer mining. There are also in many mining districts peculiarities of formation containing gold, such as divide dykes, banks, or hills of cemented gravels, sandstones, clays, &c., mostly localised, and not continuous in a course. Quartz mining is on lodes or veins which, for the most part, have a northerly and southerly course, with a general underlay east or west—may vary from a few inches to many feet in width. The determination of a main lode or true fissure vein can only be proved by actual working. From outcropping and surface indication the course of quartz veins or lodes may be traced for long distances, but their continuity can only be ascertained by development. A quartz lode having been discovered, either by outcrop on the surface or by shaft sinking or tunnelling, its course and underlie should be first proved by prospecting and the average quality of the quartz ascertained, by assay, by sample, and bulk, crushings of a fair quantity of matrix taken from different parts of the mine before deciding on the erection of costly machinery. In settled gold mine districts there are generally ample opportunities of testing the value of the quartz by bulk crushings of considerable quantity at mills in operation; but in new countries or new mining districts greater caution is necessary in thoroughly prospecting the course and underlie of the lode, and fair average selections made from the bulk of quartz raised should be satisfactorily tested by experienced persons before unnecessary expenditure is incurred by the erection of costly machinery that may never be used. When lodes or veins are discovered on the sides or tops of hills, and the opportunity offers of running in tunnels to intersect the lodes, this system of prospecting and working of large claims will, as a rule, be found most economical; but, under most circumstances, there is seldom anything to hinder a quartz mine being well prospected to at least 100 ft. in depth, and oftentimes deeper, by hand labour, and without the aid of machinery.

As to the average quantity of gold per ton of quartz or matrix that can be made to pay for working, that must in all cases depend upon circumstances and good management. In Australia and America there are many instances where with a large body of matrix under favourable circumstances, such as plenty of water and wood, and efficient machinery, that ores of low grade, varying from 3 dwts. to 5 dwts—say, 12s. to 20s. per ton—pay very well and realise good profits. As a few absolute facts are worth a lot of theory, I will give the results of some well-known companies now in operation only within the last few years that fully verify my statements. Prof. J. Alden Smith, State Geologist of Colorado, in his report on the mining development of that State for 1881-1882, as an illustration of what can be done in many places in the gold belt of Gilpin County by working on an extensive scale the large bodies of low grade ores too poor to be worked by the ordinary appliances, sets forth in full the returns and profits made by a few large mines now in work on the Black Hills at Dakota. The statement from Superintendent M'Masters shows the yields, together with the cost of mining and milling, at the different mines in the Black Hills. They embrace, as we understand it, the product of all the properties from the outset of their exploration up to the end of July, 1882. It appears that the Homestake Mining Company produced $4,367,180½, obtained from milling 684,733 tons of ore, averaging $6·37 per ton; the Highland Mining Company produced $1,175,632½, obtained from milling 234,081 tons of ore, averaging $5·02 per ton; the Deadwood Terra Mining Company produced $1,221,946½, obtained from milling 249,329 tons of ore, averaging $4·90 per ton; the Deadwood Mining Company before consolidation with the Deadwood Terra Companies produced $834,192½; the Golden Terra Mining Company produced before consolidation with Deadwood Terra Companies $788,054½; the Giant and Old Abe Mining Companies produced before consolidation with Homestake Company $72,469½; and the Father de Smet Mining Company from January, 1878, to August, 1882, produced $1,974,640½, obtained from milling 343,394 tons of ore, averaging $5·74 per ton. So that the total product was $10,434,116, obtained from milling 1,512,037 tons of ore, averaging $5·78 per ton.

In connection with the Central enterprise of this group it is significant that up to December, 1879, the gross bullion yield of the Homestake Company was $1,051,265½—For January, 1880, $78,569⅔; February, $84,868¼; March, $90,159½; April, $104,281; May, $118,463½; June, $123,413; July, $128,769; August, $144,980½; giving a total to September, 1880, of $1,924,769½. Thus we see a steadily increasing production, while Superintendent M'Masters is able to show that the cost of mining has diminished from $1·98 down to 89 c. per ton, and the cost of milling from $1·59 down to 64 c. in the 80-stamp mill, and from $1·22 down to 45 c. in the 120-stamp mill. Further, the average gross yield of the ore to June, 1879, was $9·69 per ton. Since then it has been found of advantage to extract and mill all the rock between the walls of the veins. This has lowered the grade of the ore somewhat, but the gross amount milled has been increased in proportion, while the cost of mining has been correspondingly reduced. The yield of the ore from September, 1879, to February, 1880, varied from $4·25 to $5·60 per ton; since that date it has been increased by the ore of higher grade extracted from the 100 ft. level, and now averages $7·95 per ton.

From the dividend standpoint the showing is equally satisfactory. The Homestake paid 47 dividends, amounting to $1,512,500; the Father de Smet paid 21 dividends, amounting to $540,000; the Deadwood Terra paid 20 dividends, amounting to $740,000; the Deadwood before consolidation paid $275,000; and the Terra before consolidation, $75,000; so that the dividends of the group were $3,142,500. Total assessments (or calls made) were $400,000. Now when it is considered that it is only a few years since the Black Hills was in possession of that notorious Indian chief, Sitting Bull, and his tribe of savage Indians, it is marvellous to see the rapid strides that have been made in expeditiously and profitably developing the resources of that auriferous district, and shows what can be done by good management. Much credit is due to Mr. M'Masters and the other superintendents who have so thoroughly developed their mines, and produced such highly satisfactory results from a very moderate average gross yield of gold per ton, and fully illustrates the highly profitable nature of gold mining in well-devised and well-conducted enterprises.

REPORT FROM CORNWALL.

April 12.—Still Dolcoath. When we wrote last week the balance of opinion, as we then stated, appeared to be in favour of raising the 25,000*l.* fine by the issue of new shares. Now there seems a change in the general feeling, and, while shares are still largely approved, the preponderance really appears to be in favour of a loan, not, we presume, from bankers, but by way of mortgage from private individuals. Everything depends upon the point of view from which the proposal is regarded. Offer the shares *pro rata* to the present adventurers, and, if so taken, no harm is done to anyone. It may, however, be doubted whether they would be readily taken up at their true value—so readily, at least, as one could desire. It is no use attempting to disguise the fact that confidence remains seriously shaken, not merely in Dolcoath, but in other mines on the Basset property; and, unless the new shares could be kept within the present company, and something like the *pro rata* distribution suggested agreed on, injustice would certainly be done to the general interests of the mine. There is no doubt that a considerable proportion of the adventurers are not prepared to increase their investments, and this must militate very strongly against the idea of any new issue. On the other hand, no one would be damaged by a loan, the burden of which would have a direct tendency to adjust itself equitably, and hence the very marked tendency in that direction. The idea of a call seems now to be utterly abandoned. So much for the present position of affairs, though it is impossible to forecast what changes may take place in popular sentiment before the meeting. All that is absolutely certain still is, that the fine will be paid somehow.

The Mining Institute is asked to take the initiative in getting up a meeting and an agitation for a reform of the law, and so to prevent any more Dolcoath scares or South Caradon collapses in the future. If anything is to be done some one must lead, and there is no body better qualified by knowledge and widely ramifying interests than the Mining Institute. Whatever is done should, however, be done quickly, and there is really no reason why, if action is determined on (and surely the provocation has been most ample), any time should be lost. Another month's inaction, and as well drop all idea of moving.

Strange that the candles used in the mines of Cornwall are no longer made almost wholly in Cornwall, but almost exclusively across the Tamar; and, stranger still, if the cause is, as asserted, the long credits taken by the mines, seeing that there is hardly a leading mine in the county in which at one time or another it has not been asserted that the merchants had too much sway. There must be some other reason why the Plymouth Candle Company has been able to supplant the purely local makers beyond this one question of credit; and what seems strangest of all is the persistent way in which in these days of lamps the old-fashioned candles should so persistently hold their own. There is decidedly room for reform in this detail of mining work.

Strenuous efforts are being made to improve the postal communication of Cornwall with London by starting the up mail train at a later hour from Penzance, and largely accelerating its speed; and memorials to this effect are being signed in every part of the county. The present arrangement is bad enough for towns in West Cornwall that are on the line of railway; but in many of the outlying localities, though existing in name, daily postal communication with the Metropolis can hardly be said to exist in fact, since the post barely comes in before it is time to go out. No class in the county are more interested in this reform than the mining community.

Old South Caradon dies and New South Caradon succeeds. The old Cost-book company that has deservedly won such a honourable name, gives place to a new limited company that has its name to make. Under the circumstances, and feeling that the destruction of the old company was a perfectly gratuitous piece of landlordism, it is difficult to be wholly congratulatory. Mr. Batters, under whose auspices, with Mr. Lane, the new venture is made, was careful to explain at Tuesday's meeting that if there had been the slightest chance of the old company continuing the new one would not have made its appearance. To this, of course, it may be rejoined that if there had been no one to buy out the old company the lord must either have dropped the mine, or worked the mine personally, or have allowed the real creators of the mine—the founders of the wealth of the Norris family, now represented by an aged lady, who cannot be presumed to be familiarly acquainted with business—to continue. The deed, however, is done, and the new venture is on its trial. Unquestionably all that can be done will be done to make this fresh attempt to introduce the limited principle in East Cornwall a success, and the career of the mine will be watched with much interest. Save, however, in the possession of the practical sympathy instead of the opposition of the lord, it is not easy at present to see in what important respect the working of the new company will have any advantage over that of the old. That is in the future. Meantime, is the South Caradon lesson to add no weight to the force of that of Dolcoath?

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

April 12.—This week the Quarterly Meetings of the Iron Trade have been held, and have drawn together a large number of traders from all parts of the kingdom. At Wolverhampton yesterday crucial prices were declared, without alteration upon the quarter, at 11s. per ton Earl Dudley's furnace coal, 65s. for all-mine hot-blast pigs, 85s. for cold-blast ditto, and 7*l.* 10s. to 8*l.* 2s. 6d. for marked bars. Mill and forge coal of good quality was 8s., and common forge coal 7s. to 6s. 6d. Second-class native pigs were 50s. to 45s., and common ditto 40s. Medium quality bars were 7*l.* to 6*l.* 10s., and common ditto 6*l.* as the lowest price. The amount of business transacted at Wolverhampton was not large, most buyers preferring to hold back orders for a week or so.

At Birmingham this (Thursday) afternoon the prices declared at Wolverhampton were confirmed in every particular. No alteration was made. The coalmasters determined to call the men's delegates together next Thursday to consider the question of wages and prices. The Welsh tin-plate makers met, and fixed Welsh cokes at 16s. per box in Liverpool, and charcoals 20s. The galvanisers met, and determined as far as possible to restrict production. They refused to quote prices.

Mr. W. B. Scott, the Chief Inspector of Mines for South Staffordshire and East Worcestershire, having applied for an Assistant Inspector, the Home Office has appointed Mr. W. H. Pickering, Assistant Manager to the Rainford Coal Company's Collieries, St. Helen's, Lancashire, who qualified as mine manager in June, 1881, at Wigan, after serving his articles at Messrs. Pease's West Collieries, Durham, and attending the College of Physical Science, Newcastle-on-Tyne, and the Pemberton College, Wigan.

A national conference of miners began a sitting in Birmingham at the beginning of the week to consider the question of the restriction of output, and the result of the national ballot taken on the subject, according to the recommendation of the Leeds Conference in December. Mr. W. Crawford, of Durham, presided. On the first day there were 27 delegates present, representing altogether some 229,000 men, and on the second day there four delegates. The proceedings of the conference were conducted in private.

At a recent meeting of miners at Gornal Wood it was claimed that had it not been for the existence of the Miners' Federation for the Midland Counties 15,000 miners would have had their wages reduced 4d. per day, which altogether represented 250*l.* a day.

The North Staffordshire Mining Institute discussing, on Monday, a paper by Mr. Charles Gordon, of Stoke, agreed that blasting by lime cartridge, composed of nearly pure carbonate of lime, was almost certain to be successful wherever there was compact coal with a moderately good roof; but that in North Staffordshire, troubled as they were with backs and partings in so many of their seams, it was not likely to be generally successful.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

April 12.—At the lead mines in Derbyshire business has been of a steady character, and the idea of gold being likely to be found at Eyam, or indeed in any part of the country, has been silently buried, as most befitting such a monstrosity. Of course, had there been the slightest probability of gold turning up in ever such minute quantities, it would have been matter for congratulation; but it is a metal that has not been found associated with lead, although the latter is strongly impregnated with silver. Still, there is plenty of room for a greater development of the wealth that there is known to be in the county, and in the Peak district in particular, and which only requires capital and intelligence to develope, and may be made a source of profit. It is different in the coal mines even at the present time, when it is said fuel is being sold without profit. At Unstone, some six or seven miles from Sheffield, a new coal field is about to be opened out, the seam being the well-known Silkstone. This shows that there is some spirit abroad in connection with coal mines, and that the future is looked forward to as being most hopeful. During the last two or three weeks the coal trade has been more than usually active for the time of the year, there having in particular been an active demand in the London district and at higher rates. This was the result of the cold weather which prevailed during March, when the stocks of merchants were low, and kept so purposely in expectation of prices going down in April.

Steam coal has become in better demand, more especially on the part of some of the railway companies, who are running more trains. But there has been no change as regards the quantity exported, which is still comparatively moderate. At the ironworks in Derbyshire, a steady business has been the rule, the output of pig being a full average, with a good demand for the Staffordshire and other districts. At Dronfield, matters have been particularly quiet now that there is nothing doing at the steelworks. During the week, however, several trains have been dispatched with the plant from the steelworks for Workington, and this has found employment for a considerable number of workmen. It is expected that the new establishment at Workington will be ready about the middle of June; and as the company will raise and smelt their own ore, it is expected that the results will be such that other companies or firms will follow their course, and migrate to more distant districts.

In Sheffield trade has been good all round, and there are few complaints as to slackness. At the works of Messrs. Cammell and Messrs. Brown there is marked activity in the heavy departments, there being large orders on hand for armour as well as other plates, and plant is being put down for heavy steel castings for the new ordnance, seeing that it has been decided that steel is the material that will in the future be the metal for the manufacture of heavy guns. In crucible steel a good business is being done, and there is also a large output of Bessemer, although the rail departments are scarcely so busy as they have been. But a good deal of Bessemer is now made of special qualities for various purposes for which crucible at one time was only used. It is now thought likely that some good orders will be received from America for steel rails, as the new tariff reduces the duty from $28 to $17. The cutlery houses continue to be well employed in table, pocket, and working knives, such as are required by gardeners and horticulturists. Razor-makers have been doing particularly well on American account, seeing that the new duty will be much higher than it now is, and that has led to a demand on the part of the men for increase of wages, which some of the employers have been obliged to concede.

The question of the reduction of the rates for the carriage of coal from the pits in the West Riding to London by railway is just now receiving a good deal of attention The rate from the West Riding is about 1s. 5d. per ton more than it is from the collieries in Derbyshire connected in particular with the Midland Railway, and an effort is being made to bring the rates nearer to each other. As it is Derbyshire enjoys exceptional advantages as compared with South Yorkshire, for the difference of even 6d. per ton in the rate is an

object to be fought for. From some of the pits, however, a fair business has been done of late with the Metropolis, but not to the extent that could be desired, and the quality of the coal raised. Some examples of this state of things are not without interest. Messrs. Newton, Chambers, and Co., of Thorncliffe, last month put on to the Midland nearly 8000 tons, the New Sharlston Company 1200 tons, and St. John's, Normanton, 2400 tons. A considerable tonnage was also sent from Carlton, Hoyland, Monk Bretton, and Thyborough Hall. So far as regards the West Riding pits, however, the Great Northern has been, and is, the main highway for the carriage of coal to the Metropolis. Although the rate of 8s. 3d. per ton is a high one compared with what is paid for the Derbyshire and more southern, pits. But being now directly connected with the Derbyshire coal fields it has for some time been paying less attention to South Yorkshire. Last month there was sent over the line upwards of 4000 tons from Langley Mills, in Derbyshire, while from the pits in the former district there was sent from Darfield 1600 tons; Glass Houghton, 1400 tons; Hoyland, 2000 tons; New Sharlstone, 2800 tons; Lofthouse, 1300 tons; the Dales, 1800 tons. Mitchell's Main appears to have taken the lead so far as the Thick coal is concerned, for last month it was credited with 2700 tons. The tonnage carried by the various railways during the two first quarters of 1882 and 1883 was as follows:—

	Tons—1882.		Tons—1883.
Midland	523,054	.....	556,160
London and North Western	360,144	.....	389,645
Great Western	243,531	.....	236,863
Great Northern	256,591	.....	269,827
Great Eastern	168,684	.....	191,731
Other Lines	23,457	.....	23,344
Total	1,584,461	.....	1,667,570

TRADE OF THE TYNE AND WEAR.

April 11.—The Steam Coal Trade in Northumberland is fairly active, and the prospect at present is good, the price of both large and small steam coal is well maintained, and it is likely to advance. The deputies in that district had another meeting with the coal-masters on Saturday respecting their request for an advance of 3d. per day, or the adoption of a sliding-scale. After considerable discussion both parties agreed to adopt a sliding-scale with 1½ per cent. advance on present rates, and some additional details. The agreement was signed by J. Rogers, J. Austin, and J. Dobson on behalf of the men and by W. A. Potter, J. B. Simpson, and F. C. Crene on behalf of the owners. The Baltic is now partially open and vessels are commencing to take cargoes. One of the chief collieries has orders on the books for upwards of 30,000 tons. So great is the demand for small coal that some of the works cannot supply the orders on hand, and the price has advanced largely. In Durham some of the works are feeling the want of orders a little, owing to the falling off in the demand for gas coal. Working for stock has already begun, which is a little early this year. There is still a good demand for Wallsend house coal; but for manufacturing kinds it is rather quiet. Coke shipments are expected to improve shortly. The quantity of coal and coke shipped at the Tyne Dock during the past week has scarcely reached 80,000 tons. Looking at the general aspect of the coal trade at present it does not appear to be necessary that the miners should trouble themselves much about restricting the output, either by reducing the working hours or the number of days worked.

The Tudhoe Colliery Explosion Memorial, which is to be unveiled next week, is of noble proportions. The extreme eight is 15 ft. from the base. On the four sides of the monument are carved the names and ages of the men and boys who perished from the explosion. There are also beautiful bas relief representations of several powerful and affecting scenes witnessed in connection with the explosion. The memorial is the design of Messrs. G. Ryder and Sons, Bishop Auckland, and they also executed the work.

The Iron Trade has been very quiet this week; the demand has been limited at the price for pig-iron which makers adhere to. There are a great variety of opinions about the future course of the trade; but as shipments must naturally increase at this season, and the stocks are being reduced, it is fair to conclude that an important movement may be looked for. There is a much more favourable feeling about the finished iron trade, and prices have been advancing. Ship-plates have advanced from 5s. to 7s. 6d. during the past six weeks, and a smaller advance has also taken place in bars and angles. The prices of manufactured iron are—Bars, *l*6. 2s. 6d.; angle iron, 5*l*. 17s. 6d.; ship-plates, 6*l*. 7s. 6d.; boiler-plates, 7*l*. 7s; puddled bars, 3*l*. 15s. to 3*l*. 7s. 6d.; pig-iron, No. 3, 40s. Messrs. Connal's stock is 81,619 tons, a reduction of 9229 tons in the week. The shipments of pig-iron for the week amount to 19,048 tons, and 7155 tons of manufactured iron and steel. Coal and coke unaltered.

The iron shipbuilding, and trades depending upon this great and important industry, continue to be well employed. A large steamer was launched in the Tyne on Saturday from the building yard of Armstrong, Mitchell, and Co., Low Walker. It is a splendid screw steamer, which has been built for the Russian Steam Navigation Company for Odessa; Admiral Tchehatchof is the director of the company. The vessel is built entirely of steel, has handsome clipper stems, long full poop, topgallant, forecastle, and long hurricane decks amidships. Her extreme length is 332 ft.; breadth 37 ft.; and depth 26 ft. The ship in all respects will be fitted up in a first-class manner. She will be furnished with compound engines, including the latest improvements. Cylinders 40 and 78 and 48 in. stroke. The vessel is to be named the Czar. The great works of Sir Wm. Armstrong at Elswick have long been considered one of the wonders of Tyneside. They occupy two miles of river frontage, and a great variety of important manufactures are carried on, including several specialities. Hydraulic machines for working bridges, docks, and other purposes is one of the most important. There are large blast-furnaces, very extensive works for the manufacture of artillery, extensive foundries, &c. Now that the Armstrong-Mitchell Company has been formed very large extensions have been determined on, and the necessary works will be actively pushed forward during the present year. These works include a gun-carriage manufactory, an extensive blacksmiths' shop, extensive works for the manufacture of steel, and also large iron shipbuilding works, where it is intended to construct vessels of war and other ships of the largest size. The Armstrong-Mitchell Company have received a commission from the Italian Government to construct the ship Giovanni Bauson, which is to be completed in 15 months. It appears that the Italian Government could have constructed this ship, but they could only have done so in 30 months instead of 15 months, the time to be occupied by this company.

The remarkable salt deposits on the Tees are, it is evident, to be fully utilised shortly. There is now continuous working at the Saltholme Works of Messrs. Bell Brothers, and a considerable quantity of salt is produced weekly. Adjoining these works the Newcastle Chemical Company have secured 40 acres of ground, and they will put down bore-holes there and pump the salt brine on the same system as that pursued by Bell Brothers. On the opposite side of the river Bolckow, Vaughan and Co. are proceeding with the bore-hole to reach the salt close to the Tees. The new company formed to take over Mr. Sadler's works will also put down bore-holes, and they will commence the manufacture there of soda by the ammonia process. The ammonia process is said to be very profitable, so far as it has been carried out in this country. It is, however, difficult to say what will be the effect of the competition between the Leblanc and the ammonia processes. The chemical trade has fluctuated to some extent during the past few months, but on the whole it has improved, and some of the main articles produced can now be manufactured and sold at a profit. Soda crystals are now in demand at 2*l*. 13s., bleaching powder 5*l*. 5s., and in some cases reaches 5*l*. 10s. There is the same agitation to restrict the output of these valuable manufactures which exists in the coal and iron trades, but when a profit can be realised makers cannot be expected to do this. The make of bleaching powder has been rather increased of late. It is reported that another new mining and manufacturing company in the chemical business is to be started on Teesside. The concern is to be backed by a large amount of capital. The borings for salt will be on the north side of the Tees, not far from Middlesborough, and the chemical works, which will employ a large number of hands, will turn out products quite distinct from those which have hitherto been carried out in the locality.

The quarterly meeting of the iron trades was held at Middlesborough on Tuesday, and attracted some strangers. The market was rather quiet, but towards the close there was more animation, and a good deal of iron was bought and sold. The shipments of pig-iron are very large. The deliveries of manufactured iron and steel are also large. There were not many exhibits of interest to the trade. Messrs. Macnay and Co., of Middlesborough, had a good stall. This firm showed the Lancaster fusible plug (Hanman's patent), for the prevention of explosion or damage to boilers arising from a deficiency of water; a very valuable invention. Some patent miners' picks were shown, and also De Bergnes' patent rail lifter. The next chief stall of interest was that of the Middlesborough Fire-brick Company, who showed various adaptations of bricks, blocks, &c., for steel, iron, and gas works, which are capable of resisting fire; also samples of ganister, Scotch clay, &c. Messrs. W. Petchell and Co., of Middlesborough, exhibited Kenyon's low water alarm for steam-boilers, which is a most valuable safeguard for boilers.

TRADE IN SOUTH WALES.

April 12.—The exports of steam coal for the month of March from the principal South Wales ports are as follows:—Cardiff, 500,956 tons foreign (coastwise, no return); Newport, 105,525 tons foreign, and 83,104 coastwise; Swansea, 81,206 tons foreign, and 82,562 coastwise; Llanelly, 3640 tons foreign, and 8219 coastwise. Last week there were exported from Cardiff 124,442 tons foreign (coastwise, no return); Newport, 22,713 tons foreign; Swansea, 25,442 tons foreign, and 9496 coastwise. The trade now seems to have recovered from its temporary declension, and the arrivals of tonnage are sufficient to meet the needs of shippers. Good colliery-screened may be quoted at 11s. per ton, while small coal, fit for patent fuel purposes, stands at from 4s. 9d. to 5s. 9d. The amount of patent fuel shipped in March amounted to 74,647 tons at Swansea, and 51,376 at Cardiff. Coke was sent away to the extent of 5849 tons at Cardiff, 1077 tons at Newport, and 1404 tons at Swansea.

The Iron and Steel Trades show more animation, and some large orders are reported to have been secured at various works at low prices. The amount sent away in the month of March from Newport was 12,068 tons; Cardiff, 11,490 tons; Swansea, 1111 tons. Last week a parcel of 2500 tons was sent from Newport to Calcutta, 2000 tons to Baltimore, 850 tons to Bombay, 750 tons to Helsingborg, and 600 tons to Vera Cruz. Iron ore was received at Cardiff amounting to 16,711 tons from Bilbao, and 3155 from other places; Newport received 6730 tons from Bilbao, and 2486 from other places. The price stands at from 13s. 6d. to 14s. per ton, with a tendency to lower prices.

The Tin-plate Trade remains in a depressed condition, and prices remain low. Good coke-mades are quoted at Liverpool at 15s. per box, with little or nothing doing. There are now 98 works in England, Scotland, and Wales, having 380 mills, which can turn out an average of 450 boxes per mill per week, for say 50 weeks per year, or 8,550,000 boxes per annum! Of these, at the time of writing 26 works, having 80 mills, are at a dead stand, and, taking the above average make, could turn out 1,800,000 boxes per annum; it will, therefore, be seen that the present rate of make is something like 6,750,000 boxes per annum. Now, what have we to set against this enormous present production? If we turn to the Board of Trade Returns, published last January, we find the total exports of tin-plates to all countries for 1882 were 265,021 tons (or 21,640 tons increase over the year 1881), which at 21 boxes to the ton, will give 5,565,441 boxes, and assuming than one million boxes per annum are worked up in this country, we have a total demand or delivery of 6,565,441 boxes, and which is not sufficient to cover the present production.

Mr. D. E. Williams, J.P., of Hirwain, has for some time been interesting himself in the question of the rating of royalties, and the subject is being agitated in other quarters than South Wales. The Newcastle Daily Chronicle of the 6th inst. has an article on the point, which contains the following:—In the present condition of the mineral industries there is naturally some attention turned to the old question of royalties. The royalties paid for permission to extract coal, or lead, or iron are paid in the end by the consumer, and they are an addition to the cost that is by no means small. Take, for instance, Cleveland pig-iron. Last year the production of pig-iron from the native ores of Cleveland was in round numbers 2,000,000 tons. About 6,000,000 tons of ore were required to produce that, probably nearly as much coal and limestone together, and on all these it may be said in confidence that 250,000*l*. would be paid in royalties, besides sums paid as dead rents, as rents of freehold for purposes in the extraction, and also in addition to any sums paid for damage to the surface. In the manufacture of the iron into plates, or in its conversion into steel rails, more coal is used, and more money paid for royalty. The coal that is produced for other purposes bears its share of the same burden, and the lead has a still heavier tax—a tax sufficient to close many a mine. It is not an accurate statement, but is an estimate that will not be far from correct to state that there are paid for royalties sums for coal, iron, and lead produced in the North that reach one million sterling yearly. This vast sum fluctuates little; the owners of the land take their pound of flesh whether coal mining is profitable or not, and whether wages are high or low. The owner or receiver of the royalties bears none of the cost of mining, none of its losses, and he does not even contribute to the relief funds for the support of those who give up their lives in the pit. A more glaring instance of unearned increment cannot be discovered; and one of the works of the future will be the dealing with the royalties that are exacted, because present possessors are obtaining that which ought to compensate the future possessors for the loss of the minerals that are once extracted for ever. But at the present time the glaring fault is that the coal trade is in many cases unprofitable, but the "pound of flesh" continues to be exacted. Miners' wages are low, and cannot be further lowered; it is possible that the cost of producing coal may be reduced in some other way, but one of the methods that presents itself in the foreground is that of a reduction of the royalty, or of its variation from time to time with the variation in the price of coal.

NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

The meeting of members to be held at Newcastle-on-Tyne this (Saturday) evening promises to be an unusually interesting one, the papers to be read (and of which we are enabled to publish abstracts through the courtesy of Mr. Theo. Wood Bunning, the secretary) being of a thoroughly useful and practical character. The object of the first—on Explosions of Boilers and other Vessels, by Mr. E. B. Marten—may be described as an endeavour to bring home to the reader at a glance the effects of many important explosions, and to show the causes regulating the position and form of the debris after the accident. In another part of the paper Mr. Marten explains, by means of diagrams, the different effects produced by explosions by steam alone, by steam in contact with water, by air, gunpowder, and dynamite. For instance, in the explosion of a vessel simply filled with steam the contents are launched into the air, displacing so much of the air as is equal to the steam when expanded to the point at which it is suddenly condensed, the space occupied by the water representing the condensed steam being very small the atmosphere suddenly rushes in to fill the empty space. When the steam, however, is in contact with water in a boiler when it explodes not only is the steam liberated but the water flashes into steam, and a much larger body of air is displaced.

With gas or gunpowder the residual products after condensation are more bulky than in the case of steam, and the after shock of the returning air is proportionally less violent. The same remark holds good with dynamite, which is, however, considerably quicker in its action than gunpowder. An explosion caused by air produces quite different results, and is not nearly so dangerous, since the released air simply flows into the atmosphere till an equilibrium is established, and no implosion whatever, caused by the air rushing into the space left free from the condensation of the exploding fluid, takes place. It is the intention of the author to illustrate his paper by means of experiments.

The Two Systems of Working the Main Coal at Moira, Leicestershire, are treated of in a paper by Mr. W. S. Gresley, who states that his present observations may be considered as supplementary to Mr. G. Fowler's paper already in the Transactions of the Institute. The first portion of Mr. Gresley's communication is a description of the main coal, illustrated by maps and sections, and it is described as being a hard coal between 10 and 14 ft. thick, mixed with soft bands called dice; although containing no parting in its southern portion, it is divided into two distinct beds in the north by a band which, near the outcrop, is no less than 60 ft. thick; it is a good deal broken up by faults, and the cleat varies in different portions of the seam. The author remarks that in the south the top part of the seam is the best, and in the north the bottom, the whole seam in the centre of the field being of much the same quality. The first system which was adopted to within the last few years was arranged with the view of extracting the hardest portion of the coal in the upper half of the seam, by a modification on the longwall method in the gob-road system—that is, commencing to work out the coal at or near the shaft, pillar, or main road pillar side, and extending outwards towards the boundary.

The second and improved system commenced about four years ago. The leading features of this system are to work out a much larger portion of the seam, to do away with the costly produce of wedging out the bulk of the coal, to produce the coal in large masses, and to reduce the cost of extraction; and it is carried on by working home. The gate-roads, air-courses, and opening of headings are first driven, thus proving any faults, old workings, &c., and the stall faces are then started. The gate-roads formed in the lower coal are driven on a new method. In the first place, a so-called pioneer heading, 3 ft. 3 in. square, is driven forward on one side, level with the floor of the intended way, to a distance of 5 yards, the coal is then holed 6 ft. deep along the side of the little head the coal is then nicked and the shot put in 18 in. from the roof, the finished size of such a gate-road being 9 ft. wide by 8 ft. high. The mode of ventilating the working is then described, and a few details as to the manner of carrying on the works are given in a table at the end. The first system is shown to leave behind 77 per cent. of the whole of the seam; the new method only leaving behind 60 per cent., so that 17 per cent. more of the seam is extracted by the new method.

The third paper—on Internal Stress in Cylindrical and Spherical Dams, by Prof. W. Steadman Aldis, M.A.—is an elaborate mathematical investigation as to the relative advantages of cylindrical and spherical dams employed in shutting off water from the working parts of the mine; but although of great utility and importance does not admit of an abstract suitable for a newspaper being made. The discussion on the several papers will be referred to in due course.

EXPLORING MINES FILLED WITH NOXIOUS GASES.

RECOMMENDATION BY THE SECRETARY OF STATE.

At the ordinary monthly meeting of the Manchester Geological Society, held on April 3 (Mr. JOHN AITKEN in the chair), Mr. Joseph Dickinson, Her Majesty's Inspector of Mines, said that his attention having been requested to the subject of a respirator and a lamp for penetrating noxious gases in mines, he had put together a few observations which he hoped might prove useful. Sir H. De la Beche and Dr. Lyon Playfair, in a report to Viscount Canning, in 1846, had pointed out "that after an explosion a sufficient quantity of oxygen remained to support the respiration of those who survived its effects, were it not for the presence of carbonic acid. This gas when present in no greater proportion than 1 or 2 per cent. was capable of producing the most injurious effects. It had, therefore, been suggested that cheap mixtures made of substances capable of absorbing carbonic acid, such as Glauber salts and lime, would prove useful to those who tried to aid the sufferers after the explosion. Such a mixture, placed in a coarse bag, and applied to the mouth, would effectively absorb the carbonic acid, and prevent it exercising any injurious effect upon respiration."

He then referred to the evidence of Dr. Hutchinson in 1849, and to the late Mr. T. Young Hall's paper read before the North of England Institute in 1853, to the Denayrouze apparatus, and to the Fleuss exploring respirator, all of which had long been known through the medium of the inventors, the public prints, and otherwise, but they had not come into common use. The Secretary of State had had his attention drawn to the Fleuss invention, and was anxious that the Inspectors of Mines should make it well known, and that the various colliery districts should participate in its advantages. It was suggested that stations should be organised in mining districts, where the apparatus should be stored in sufficient numbers, and maintained in readiness for immediate use, and where the instruction of the men from the surrounding coal mines in its use should be systematically carried out in order that a rescuing party could thus be speedily on the spot after the occurrence of an accident. Thirty-one years ago he (Mr. Dickinson) formed one of a party in re-opening a colliery after an explosion and fire, when hand-bags of Glauber salts and lime were used for breaking through, but they did not appear to have been much used since. The Denayrouze apparatus was brought to a serious case of fire surrounded with fire-damp in a colliery in North Wales, but neither the inventor's agent nor anyone would trust to it to descend the shaft amidst irrespirable gas, and the old-fashioned means had to be used. Some better results had attended the Fleuss apparatus, but with it organisation was required. Oxygen gas had to be provided, and men instructed in the use of the apparatus were necessary. The diving-dress was acknowledged and practised now and then in pumping pits, and it was put on when upwards of 200 persons were shut up in the Hartley Colliery by the breakage of the pumping-engine beam, and had been proposed for other occasions, but without much useful effect. The recommendation of the Secretary of State was, therefore, now commended to the earnest consideration which that society always gave to important mining subjects, and to the earnest consideration of the other colliery owners of the district who were not members of the society.

The Chairman said the subject brought before the society by Mr. Dickinson was one of great importance, to the mining community especially, and as the next meeting of the members would be held in Wigan it would, perhaps, be as well to adjourn the discussion to that meeting.

Mr. J. S. Martin (the hon. secretary) intimated that they had hoped to have had one of the Fleuss apparatus before the members at that meeting, but the inventors had been unable to get it there in time; it was, however, probable that one would be shown at the Wigan meeting.——The discussion was then adjourned.

SAFETY-LAMPS FOR MINES.

An adjourned discussion on a paper communicated by Mr. Dickinson at a previous meeting, on "the Mueseler Safety Lamp and Testing Apparatus at Celynen Colliery," was resumed.

Mr. Teale (Manchester), whilst admitting that a means of testing lamps which would be thoroughly effective would be a great advantage, said that Mr. Green's arrangement which had been described by Mr. Dickinson, though exceedingly simple, was not of such an efficient character that it could be relied upon to detect a defective lamp. To adopt such a system, he thought, would be a great disadvantage. He thought the men would be liable to look upon such an apparatus as a means of taking away their responsibility of seeing to the proper condition of their lamps. If the lamps passed the test the men would go to work with them even though they might be in a defective condition. He considered Mr. Green's apparatus a crude arrangement, which would show some defects in a safety-lamp, but it was by no means a testing apparatus in the full sense of the term. With regard to Mr. Green's improved lamp, the shield was certainly to some extent an advantage; but, at the same time, the more they carried up the shield the more they interferred with the ventilation of the lamp, and it would not be a sufficient protection to the lamp in an eddying current.

The Hon. Secretary read a communication from Mr. Purdy, of Eastwood, near Nottingham, who considered the improvements made by Mr. Green in adding the shield round the lamp to be very much in principle the improvement which he (Mr. Purdy) had carried out. With regard to the double gauze, he should say, so far as his experience of the Mueseler went, that this would too much limit the passage of air, and consequently diminish the power of light.

Mr. James Ashworth (Derby) also forwarded a communication, in which he said that Mr. Green's lamp, with the shield, closely resembled the Mueseler-Thonard tested by the Belgian Commission, which proved unexplodable in 14 experiments made in velocities ranging from 6·560 to 13·12 ft.; but out of 64 experiments in a velocity of 19·68 ft. three explosions occurred, also three of simple passage of the flame into the gauze cylinder. The Commissioners further remarked that the Mueseler furnished a much greater number of cases of complete extinction than the Thonard lamp; but in the latter the combination of the gas under the wire gauze was the most active. In fact, out of 64 experiments at a velocity of 19·680 ft., the latter lamp was only completely extinguished eight times. Mr. Green's projection under the horizontal gauze might, of course, cause complete extinction in the Thonard, as in his own tests; but the whirling motion of the ignited gas under the disc gauze must be caused by the outer shield, corresponding with the whirling motion of the flame of a Clanny lamp, as he did not ever remember seeing the motion under the disc of an ordinary Mueseler. The shield for the disc gauze in an improved Mueseler he had previously brought before the society was designed to meet the same risks as Mr. Green's, but at the time he designed it he was of opinion that the passage of the flame through the disc gauze arose from the fact that the gauze in the return side of the chimney became an upcast to carry off the products of combustion which could not escape up the chimney. With the addition of his shield and chimney he never succeeded in getting an ignition under the disc gauze. Mr. Green's shield offered no protection to the top of the chimney, but in his (Mr. Ashworth's) new lamp the cylindrical gauze chimney and the horizontal gauze were completely protected from the effects of any velocity of current.

Mr. Dickinson said the communications brought before the society were entitled to serious consideration. Mr. Teale was one of the largest manufacturers in the district, whose lamps were in use in many of the pits, and he must have a perfect connection with the subject. He wished that Mr. Green had been present to answer Mr. Teale, as he was one of those persons who, according to Mr. Green, held opinions with regard to the testing of lamps which were entirely wrong. Mr. Green's opinion with regard to the testing of lamps, he might say, was in accordance with a memorial which was addressed by the working miners of Great Britain two years back to the Home Secretary, in which they wished to make it compulsory to have all safety-lamps subjected to such a test. With regard to Mr. Ashworth, he was entitled to every respect, as he had taken a very important part in the experiments at Brynn Colliery, carried out by Mr. Smethurst. It seemed that as the result of those experiments Mr. Ashworth had produced a lamp which had a tight-fitting copper cap covering the whole of the gauze. How this lamp would burn he did not know—that would have to be tested. Mr. Smethurst had produced an almost identical lamp, except that the cap was movable. This was a lamp which he had himself tested. On Saturday last he took it down a colliery, when it was exposed to currents of the highest and lowest velocity, and the burning was not at all interfered with, and except on one unimportant minor point he had no fault to find with it. Mr. Purdy had also given great attention to the subject, and he (Mr. Dickinson) hoped that the observations which had been made would be considered only with the object of bringing what was good out of all of them.

Mr. Martin thought the objections raised by Mr. Teale with regard to the defects in Mr. Green's system of testing could be easily overcome; but as to the objections to testing lamps, the same argument had been raised with regard to safety catches, detaching hooks, and other apparatus.

Mr. Teale replied that he should be the last one in the world to say that lamps should not be properly examined, still further that they should not be tested if the test was to be efficient. He was, however, certain that there was no test known at present that could be considered efficient. It was far better to rely upon having a lamp properly and simply constructed and thoroughly examined before it went below by a man, who should not have more lamps to examine than he could go through properly.

Mr. Martin thoroughly endorsed Mr. Teale's remarks with regard to the examining of lamps; but he did not see why they should be examined less carefully because they were tested.

The discussion then closed.

PRACTICAL TUNNELLING—ROCK-DRILLS.

The process of driving the Summit Level Tunnel of the Bettws and Festiniog Railway was described by Mr. WILLIAM SMITH, M.I.C.E. in an interesting paper read before the Institution of Civil Engineers on April 3. The author stated that the object of this railway was to afford more direct communication between the slate-producing district of Festiniog and the home markets. The line commenced at Bettws-y-Coed, traversed the valley of the River Conway for about 1 mile, and then followed the valley of the River Lledr. It next passed under the mountainous ridge between Carnarvonshire and Merionethshire in a long tunnel, ran along the Dinas branch of the Festiniog narrow-gauge line, and terminated at Blaenau Festiniog. The total length was about 12 miles, and, except at the stations, the line was laid with a single way. The summit level tunnel was 3860 yards in length. It was carried out by the staff of the London and North Western Railway Company, the greater part of the remainder of the works being executed by contract. The tunnel works comprised the sinking of three shafts, the driving of eight headings, and opening them out to the full size of the tunnel. The rocks perforated consisted of very hard members of the metamorphic system; and it was stated that at the south end, in passing under the Welsh Slate Company's Works, great care was necessary, and a strong casing or lining was required to sustain the heavy weights above and around. The tunnel had an ascending gradient from the north end of 1 in 660 for a distance of 1 mile and 58·4 chains, followed by a level portion at the summit of 0·75 chain, and then a descending gradient of 1 in 660 for a distance of 36 chains to the south end. It was 18 feet 6 inch in height, and 16 feet 6 inch in width. The deepest of the three shafts slightly exceeded 143 yards, and all were rectangular, 12 feet by 6 feet, with the longer side in the direction of the line of the tunnel. The winding machinery comprised, at each shaft, a boiler of the locomotive type, two small high-pressure engines, with spur-wheel and pinion and winding drums; the latter were 6 ft in diameter, and the whole could raise a gross load of 30 cwts. at 8 ft. per second. The timber head-gearing carried two pulleys, each 8 ft. in diameter, and was fitted with Walker's detaching hook to prevent over-winding. The ropes were of steel wire, the breaking strain being 20 tons. Five air-compressors were constructed to compress to a pressure of 50 lbs. per square inch, sufficient air to supply six rock-boring machines at each face. The compressor steam-generators were second-hand boilers. The pipes for conveying the compressed air to the workings were of wrought-iron, of 3½ in. bore to the bottom of the shafts and of 2½ in. bore from thence to the face of the workings. Superfluous water was raised to the surface, from a sump at the bottom; from two of the shafts by a wrought-iron vessel, attached to the under side of the cage, which filled and emptied itself automatically; but at the other shaft was in excess, and a force-pump had to be employed. The shafts were mainly sunk by hand-labour.

The drill carriages for supporting the machines, the drilling machines themselves, and the modes of actuating them, were then described at length. At the north end of the tunnel an experimental drill carriage was employed, in conjunction with electric firing, with the view of taking out, as one large heading, the full section of the tunnel; but for want of success in electric firing it was eventually abandoned, and the St. Gothard type of carriage and machine was substituted. It was equipped with six Ingersoll drills, fitted with automatic feed. At the south end a small drill carriage was constructed, suitable for an advanced heading only, and provided with six Burleigh drilling machines with hand-feed. At the six intermediate faces the carriages were of the type adopted at the St. Gothard Tunnel, with MacKean drilling machines, four at each face, driven by compressed air. Two forms of drill points were used, the chisel single-cutting edge for solid rock, and the cross point for jointed rock. With regard to the workings at the bottom of each shaft, a top heading was driven in the first instance. Driving the advanced heading comprised three distinct operations—boring the holes at the face, charging and firing, and removing the debris. Of the various explosives used, cotton-powder or tonite answered well for the removal of rocks in unconfined places; but dynamite and lithofracteur were most effectual in the advanced headings. The advanced heading was 8 ft. square, and usually required from 15 to 30 holes about 3½ ft. deep, and from 1 to 2 in. in diameter, to remove a complete slice off the face. The operation of the drilling machines mounted on the carriages was then described, a speed of 300 to 500 strokes per minute being attained, also the method of charging the holes and firing by hand, which was somewhat different to that ordinarily pursued. Following in the wake of the advanced heading in the top of the tunnel was the removal of the two sides. This was done principally by hand-labour, and changed the section of the opening from a square to a semicircle. The excavation of the lower portion was effected by driving a gullet along one side of about half the width of the tunnel to the full depth, leaving the other half for a roadway. The remaining portion was then attacked partly by hand, partly by machine drills at various points.

Reference was next made to the progress made at each of the shafts and headings, from which it appeared that the average upon the whole of the eight faces amounted to 14·09 ft. per week. The total quantitiy of water finding its way into the tunnel was about 100,000 gals. per day. The total cost of the tunnel and three shafts complete, including labour, plant, materials and sundries was 302,850*l*., divided as follows:—Labour 203,000*l*.; plant 25,630*l*., and materials and sundries 74,220*l*. Allowing as a credit the half-cost of the plant, which it was assumed might eventually be realised, the reduced cost would be 75*l*. per lineal yard; and taking the whole cubical contents of rock and other substances actually removed, the cost per cubic yard was 2*l*. 8s. 10d. The tunnel was opened for public traffic on July 22, 1879.

Meetings of Public Companies.

SIERRA BUTTES GOLD MINING COMPANY.

The ordinary general meeting of shareholders was held at the Cannon-street Hotel, on Thursday,

Mr. FREDERICK TENDRON in the chair.

Mr. JOHN SAUL (the secretary) read the notice convening the meeting, and the reports and statements of accounts were submitted.

For the half-year ended Dec. 31 the accounts showed a balance to the credit of profit and loss of 8761*l*. 7s., out of which the directors recommend a dividend of 6125*l*. (1s. per share), leaving 2636*l*. 7s. to carry forward. The amounts paid in connection with the Cross and Co. assets settlement, as the proportion applicable to Sierra Buttes Mine, have been written off, and the question has thus been finally disposed of. The mine produced 15,769 tons of ore during the half-year, and the same quantity was reduced by the mill. The average yield of the ore was 87·43 per ton, and including the produce of the tailings $3·18 per ton. The working expenses averaged $5·56 per ton, the mining cost including all prospecting having been $4·93, and the milling cost $0·58 per ton. Excluding the cost of the eighth and ninth levels, the average working expenses would have been $4·15 per ton. It may be mentioned that the cost of constructing the eighth level was $0·51, and of the ninth $0·90 per ton of ore worked.

Capt. James's report, descriptive of the half-year's operations, is appended, in which he says—There has probably been more prospecting and deadwork done this half-year than during any six months in the history of the mine; the results from which, I am sorry to say, have not fully come up to expectations, as it will be remembered that larger bodies of ore were looked for on the course of Willoughby's shoot in the eighth level than have been met with; however, it must be gratifying to all connected with the property to know that the great lode still maintains its masterly appearance at the greatest depth attained.

The directors' report of October, 1881, contained a reference to a small, but valuable vein, which had then recently been discovered in the sixth level, and which it was stated had the appearance of lengthening as it went down. To test this a rise from the seventh level was put up under the vein 316 ft., and connected with the sixth level. Stopes opened near the top of this raise show the pay part of the vein to be from 1 to 3 ft. wide, and worth from $6 to $10 per ton. Mr. Johns says "the indications now are, that this little so-called shoot is a part and parcel of the main one," and that "in stoping below the sixth level from the 4th raise the ore is found to be gradually making over towards the hanging-wall, and Capt. James thinks, from this and other indications, there can be no doubt but that it is really a continuation of the main shoot, and which is found on the hanging-wall under this point in No. 7. The ore at No. 7 extends considerably west of this little outcrop in the sixth level, and the end of the main shoot has not yet been reached."

Mr. Johns also says—"The developments in the eighth level, meagre as they have been, are an improvement over the developments in No. 7 up to the same point; and let the developments on the bonanza be whatever they may there is no doubt that they will be satisfactory when the main shoot is reached." The ninth level was extended 781 ft. during the half-year, its total length then being 1979 ft. from the mouth. What has been stated in previous reports may be repeated here, that "no discoveries were made, and none are expected for a considerable time."

The Plumas Eureka Mine account for the half-year ended Dec. 31 shows a balance to the credit of profit and loss of 28,322*l*. 15s. 9d. The balance brought forward from the previous account was 34,858*l*. 10s. 4d., and after providing for the October dividend and the amounts paid as the proportion of this mine in connection with the Cross and Co. assets settlement, 10,244*l*. 14s. 11d. remained to be dealt with. This, with 18,078*l*. 0s. 10d., the net profit of the half-year's operations, makes the credit balance of 28,322*l*. 15s. 9d., as stated above. Out of this balance the directors recommended a dividend of 2s. per share, free of income tax, amounting to 14,062*l*. 10s. The quantity of ore produced during the half-year was 20,075 tons from the Plumas Eureka Mine, 755 tons from the Seventy-Six Mine, and 8630 tons from the Rough-and-Ready and Elizabeth Mines, giving a total output of 29,460 tons. The mills reduced 29,490 tons. The average cost of mining, including prospecting, was $3·35 per ton, and of milling $0·45 per ton, thus making the average working expenses $3·80 per ton. The average yield of the ore in free gold was $6·60 per ton.

The usual reports of Mr. Johns and Capt. Hosking show that 2827 ft. of new levels, winzes, &c., were opened. The cost of these prospecting works was 6461*l*., including 2138*l*., spent on the construction of the Eureka tunnel. In regard to the general results of the prospecting, Capt. Hosking says:—"Although the developments have not been in proportion with the large amount of dead work performed, still our efforts have not been entirely fruitless. The new shoot of ore in the 150 ft. level is no doubt a valuable discovery, and we sincerely hope it will prove to be a permanent one." Mr. Johns (Feb. 19) writes:—The appearances and prospects of the property have greatly improved during the past half-year, both in the Eureka and in the Elizabeth portion of the Rough-and-Ready, and although they are not as good yet as they were some years ago, the indications are very favourable for their becoming so during the present year."

The principal developments made in the Plumas Eureka Mine during the past half-year were in the 150 and 300 ft. levels south of No. 3 winze. The 150 was extended 133 ft., of which 100 ft. was run through a vein 4 to 6 ft. wide, and worth from $6 to $8 per ton. The 300 was run 293 ft., and for 287 ft. of that distance the vein was found to be 3 to 5 ft. wide, and worth $6 to $7 per ton. A winze is being sunk below this level, which at the date of the latest advices had attained a depth of 56 ft., and Mr. Johns says, it is developing a very good body of ore; the vein is here also going down perpendicularly, and is from 4 to 5 ft. wide, with walls well defined and firm. These improvements in the size and firmness of the vein are very encouraging. The 300 level was a great improvement on the 150, and the winze below the 300 proves that the vein is increasing in size and firmness as it gets deeper, and we hope that in the Eureka level it will be found equal in all points to what it was in the Mammoth. Nothing of any value has yet been found in the 150 and 300 run from the Mohawk shaft towards the engine winze. The Eureka tunnel was run 560 ft. during the half-year, making its length nearly 3000 ft., it has still to be extended about 400 ft. further to reach under the Mohawk shaft. The Elizabeth Mine, which has hitherto been regarded as a portion of the Rough-and-Ready Mine, has not previously been mentioned in the directors' reports, but the developments made during the term give it a separate importance. A small tunnel has been run 116 ft. on the vein, which is flat and irregular, varying from 6 to 10 ft. in width, and worth about $7 per ton.

The CHAIRMAN said: The average cost for the past half-year of working Sierra Buttes Mine, and of exploratory works in the 8th level, was $4·66, as against $3·95, the average of the seven preceding half-years. The cause of the increased cost was that just before our last meeting the Hanks mill was swept away by a snowslide, so that we were entirely dependent upon the work done by the Hitchcock mill. I told you that we did not think it worth while re-erecting any portion of the Hanks mill; that the ore bodies in the upper part of the mine were very poor, and barely worth working, and that Nature had only done for us what we should have had to do for ourselves in a very short space of time; but as the Hitchcock mill is only a 50-stamp mill it cannot stamp more than from about 2500 to 2600 tons a month. The work done by it last half-year was 15,703 tons. Now, as our working cost has to be spread over a much smaller tonnage, there is naturally an increase per ton, and for us to earn the present dividend we need an average yield of ore of something like $7. The stopes as between the 7th and 6th levels are getting upwards towards the 6th level, and I explained to you that one of the great features of the mine was the improvement that was shown in the 7th level over the 6th. Therefore, you will readily understand that as the stoping gets towards the 6th level, the yield per ton being less, our monthly earnings must necessarily be smaller—that is, until we can by underhand stoping do some work in the 7th level. The return of the Sierra Buttes Mine, which you will receive this evening, shows for the month of March receipts $18·397; expenses, $14·848, and you will see from that that the present rate of profit is not earned, and the explanation is that the average produce per ton was only $5·88. Before we can reap anything like a full advantage from this magnificent shoot, called the Mammoth shoot, in the 7th level, we must have a new mill erected, and that new mill will be erected near the mouth of the 9th level, which is situated some 492 ft. vertically below the 8th level, or about 700 ft. on the dip of the vein, and it will have to be driven about 2400 ft. before it strikes the vein. It has to be driven at an angle towards the vein, and I suppose in a month or two it will have struck the vein. At the present time it is in about 2248 ft. The 8th level, which is the level by which we shall work this Mammoth shoot, is now in about 3750 feet, and it has to be driven 1000 ft. further before it gets under the Mammoth shoot, and the period required for that is about 18 months—to be on the safe side we will say 18 months, and, therefore, until we can get under this large body we have to depend upon the amount of ore that still remains underneath the shaft, and upon what we shall get from this body by underhand stoping. There would be no difficulty in the underhand stoping if it were not that the Buttes Mine is what is called a wet mine. There is a great deal of water in it, and unless you have a great deal of powerful machinery you cannot profitably get down to any great depth; but we can see our way at present to getting quite sufficient ore to maintain the present rate of dividend, and to meet all our expenses other than those of the 9th level. By mixing a certain quantity of the ore from below the 7th level with the poorer ores near the 6th level we shall be able to keep up our average of $7 a ton. The telegram received yesterday tells us that they have already gone down 13 ft. in this body, and that its value is $10 a ton. This is a matter which I want to call your attention very specially to. The average yield of the mine for the last half-year was $8·18; as against an average for the seven preceding half-years of $6·16, and out of the 15,700 tons stamped only 10,000 tons came from the Mammoth shoot; the rest came from poorer stopes in different parts of the mine, so that you have here the clearest proof that it is not a matter of estimate that the ore in this great shoot is worth $10 a ton, but you have got the actual proof by the six months' working. I do not know anything that can be more satisfactory to the shareholders than to find that they have got a shoot proved 850 ft. in length, of an average width of 4 ft., and of the quality of $10 per ton. The great shoot in the Eureka, I will just tell you, *en passant*, was 800 ft. long and from 3 to 4 ft. wide of $10 ore, and it was then considered one of the largest and finest shoots in California. You have that shoot surpassed by the Mammoth shoot of the Sierra Buttes. I want you to take this clearly into your minds, because you have got an unpleasant time to go through till then. The next 18 months will be a time in which you must not expect a larger dividend than you are now receiving of 5 per cent. After that, I think you may fairly hope for very much better things; but before we can get a return from this ore-vein when the 8th level is underneath it, we must have a mill to stamp the stuff, and to get into the 9th level we must have a rise made from the 9th to the 8th level, so that the ore may be shot down to the 9th level, and then run along the tramway to the mill. Now, all this means money. The cost of a similar mill at the Eureka was 13,000*l*., and in 15 months the whole amount was paid out of profits. We shall only put up 30 stamps at first; but we shall want, I reckon, from 10,000*l*. to 12,000*l*. for the mill, and we shall also want money to carry on the 9th level. Until the mill is available I reckon that we shall have about 18 months to provide for, which, at 3000*l*. each six months—the present costs—amounts to another 9000*l*. or 10,000*l*., so that we want about 20,000*l*. I do not anticipate the least difficulty—in fact, I know there will be no difficulty in raising the money. The board have not yet taken very fully into consideration the form it will take, but it will probably take the form of three years' debentures, issued at par, and carrying interest at 6 per cent. I saw yesterday our esteemed friend Mr. MacCalmont, who, as you know, holds 100,000*l*. and more in each of these mines, and he told me that not only would he take his proportion, but he would take anything that the other shareholders did not. (Cheers.) So that, so far as our finances are concerned, we have nothing to trouble ourselves with in any way. I do not like trespassing on the reserve fund. Last half-year, you know, we spent 3000*l*. on the 9th level out of it, and that has brought our reserve fund investments down to something like 8000*l*. I fully believe we shall repay the whole of this debenture money within 18 months after the mill being started. (Hear, hear.) The only unpleasant matter that has occurred has been the breaking of the Sardine dam. Well, we are not responsible for it. The dam was well constructed, but the rock, it appears, is a rock that is acted upon by water, and was softened and got undermined, and the breakage caused a great amount of damage. There was not really much damage done to property, but it did apparently an immense amount of damage, carrying down huge boulders and sweeping away the bridge and a few works along the river side. It looked something terrific, but the actual amount of damage was only small, and as it occurred while I was there, had the people whose property was damaged been moderate and modest, I would have given them money to the extent of their losses; but you know how it is, if you are good natured they try to take advantage of you. They sent in such extravagant claims that we determined to fight them. The case is still under litigation, and I do not mean to say anything more on it at present. There is nothing serious in it, at all events. We are assured by our lawyers that we shall win the case; but you know that you get assurances of that kind which are not always fulfilled. (Hear, hear.) But, in any case, it is not a serious matter. The other matter was the expectation that we should run short of water for the Hitchcock mill. That is a mill which runs only by water, and if the water fails you have to hang up some of the stamps for a short time, and we might have expected short supplies in August and September. Very little snow fell, and much of what fell evaporated, owing to the extreme north-west wind that prevailed. All interests in California suffered, the hydraulic mines more than ourselves, and the agricultural interests to a great extent. The telegram we received yesterday stated that snow had fallen, and that the prospects for water were more favourable. I think I have now brought before you the main points in connection with the Sierra Buttes Mine, but I will inform you of the dividends we have received, as it is always satisfactory to us to see what we have earned. We have paid dividends amounting to 268,262*l*., of which 241,410*l*. has gone to the original shareholders, which is equal to a dividend of 10 per cent. for the whole period of the company's existence. I will end my remarks concerning Sierra Buttes with the following brief extract from a letter of Mr. Johns:—"There is no doubt but that this mine has a splendid and profitable future before it. In the Plumas Eureka the average cost for the past half-year has been $3·80, against an average of $3·40 in the preceding seven half-years, and its yield was $6·60, against $7 for the preceding seven half-years. The clean-up of the mine for the month of March was $38·331, the expenses $21·801, and the average value of the ore was $7·11. The Mammoth mill worked for a very short period, for only about five months out of the whole 12 months. The Mohawk mill, as usual, did good work; it is one of the finest mills in the State. It crushed 4700 tons a month. It has the great advantage of giving very large returns, but there is this misfortune connected with it—that with such a large stamping-mill you have to keep a very large supply of ore, and you have to keep your reserves well ahead of your extraction, and therefore we impressed upon them the absolute necessity of their developing this property in every direction. They are pushing the works on, and they will continue these works as soon as the snow disappears, at the Rough and Ready, at the Elizabeth, at the Seventy-Six, and in one or two other portions of the company's property. During the last summer months a drive was sent through the flat vein, called the Elizabeth, for 116 ft., and the ore was from 6 to 10 ft. wide, of a quality of $8 per ton. I mentioned at the last meeting that these flat veins were very peculiar—in fact, as Mr. Johns puts it, they are a puzzle to the scientist. If I might hazard an opinion upon it I would say that these flat veins are like lava overflows, and that when you have a vein of this kind your business is to explore it until you can find the channel up which the vein came. When they had driven about 100 ft. the vein changed its angle, and became nearly vertical, and they have now sunk about 40 ft. in this, and the vein is 4 ft. wide, of $8 ore, and it looks almost as if they had found the channel up which that portion of the flat vein came. What the future will reveal of course we cannot know. We shall look forward with a great deal of interest to the work carried out this summer; and without being unduly sanguine we may hope for some very important results. At all events, the ore laid open will help to keep the Mammoth mill profitably employed, and if they find that this body makes down continually they will open out upon it, and I trust they will take the same steps with the Seventy-Six Mine, and that they will try to find the channel up which this very much larger vein—the Seventy-Six vein—has come. And it is a very extraordinary thing that they have even found a flat vein of similar nature in the Eureka Mine, and they have found it there at a depth of 1200 ft., or something like that, from the surface, near the intermediate level, and the telegram tells us that they have gone in this flat vein 62 ft. from the foot-wall of the main vein, and it still holds good, 3 ft. wide, of $7 ore. There is a great future for this mine. At all events we may reasonably hope for a great future; but we must take care that our works are carried on, as I said, even more energetically than before. The 150 ft. level—that is 150 feet below the Mohawk tunnel—was a most disappointing level. It threw out all their calculations as to reserves. Out of a length of 362 feet the vein matter was only found to be 186 feet, and then it was only about 2½ feet wide. It was good ore, but only about 2½ feet wide; and it was then that we sounded a note of alarm. We thought it necessary to warn the shareholders that there would be a reduction of dividend, and that some time might elapse before we could place the same confidence in the mine that we had previously reposed. We sunk as rapidly as possible to the 300 ft. level in the hope of finding the vein better there, and it was very much better. They had no less than 300 ft. of good vein there 4 ft. wide, of $6½ ore. In the meantime they have pushed forward this 150 ft. level, and have come on to a better body of ore. I told you of this body at the last meeting. It is 80 ft. long, and 7 ft. wide, of about $7 ore. They put up a rise in this, and the rise went up about 120 ft. in good ore, and has turned out the reserves you see marked in brown on the plan. They sunk down in the body, and they found it a good body, and they have opened it up lengthwise for 90 ft., the vein having an average width of 8 ft., and its quality is about $7. I think you know by experience that when they tell you it is $7 ore it generally turns out $8. The great work we are carrying on in the mine is the Eureka tunnel. It was commenced in June, 1878. It is now in 3150 ft., and it has to be driven about 2000 ft. more before it reaches the main clamper shoot, and all the expenditure at the Eureka Mine is borne out of revenue. The mine is doing exceedingly well. It is paying a good dividend—a 10 per cent. dividend. It is earning more than the dividend. It is enabling us to accumulate our reserves. The dividends paid amount to 309,373*l*., and the average throughout is an average of 10 per cent. per annum. Now, gentlemen, please do not expect more than 10 per cent. for a long time to come. I want to impress that on you. You may see the earnings very large; but we shall strenuously oppose any increase of dividend until this mine has a reserve fund commensurate with the importance of the undertaking, and until they have developed much larger bodies of reserves than they have at present. (Cheers.) The only other matter I have to mention, and that very briefly before I sit down, is that the directors think their remuneration ought to be slightly increased. (Hear, hear.) I think you will see that we have been very modest in our suggestion. I shall move the formal resolution to adopt the report and accounts, and for an increase of our remuneration, and I will put it when I have replied to any enquiries which may be addressed to me. I shall move "That the reports of the directors, together with the accounts, be and are hereby received and adopted; and that until otherwise decided by a general meeting, there be paid in addition to the remuneration fixed by the Articles of Association, a sum of 50*l*. per annum to every director, and a further sum of 50*l*. to the Chairman."

We did not think it desirable to have a special resolution for this, or to take it out of the hands of the shareholders. We wish the shareholders to have it entirely in their power how long the change in the remuneration shall continue. I think the shareholders know the directors too well to imagine that should any unexpected misfortune occur the directors would continue to take the additional remuneration. (Cheers.)

Mr. CHARLES WRIGHT: I beg to second the motion and I must also congratulate my brother shareholders on the present position of the company, and the great future that I think is in store for both mines. The position and prospects are very different from what they were.

The motion was then put and carried unanimously.

Mr. PIGEON: I should like to know what has become of the reserve carried forward last half-year of 8869*l.* 5s. 1d. in the Sierra Buttes account? I see no notice taken of it in the present report.——The CHAIRMAN: If you will look at page 24 you will see a most unsatisfactory explanation of it. I say "most unsatisfactory" because it was used to discharge those matters connected with Mr. Coulter. That we do not wish to refer to again if it is possible to avoid it; but the shareholders know all about it. (Hear, hear.) Page 24 gives a very full explanation. I should add that the proportion to Messrs. MacCalmont is a re-payment, not a payment. It was the repayment of a loan they made to us to enable us to carry out the settlement in connection with the Cross business. I now move "that a dividend of 1s. per share, free of income tax, be and is hereby declared on the Sierra Buttes Mine shares, payable on the 13th inst."

Mr. SKEEL seconded the motion which was carried.

The CHAIRMAN then moved "that a dividend of 2s. per share be, and is hereby, declared on the Plumas Eureka Mine shares, payable on the 13th inst."

A SHAREHOLDER seconded the motion, which was carried.

The CHAIRMAN moved the re-election of the retiring director, Mr. Charles Wright.——Mr. PIGEON seconded the motion, which was carried, and Mr. WRIGHT returned thanks.

The CHAIRMAN moved a vote of thanks to the secretary, to Mr. Johns, the superintendent, and the other officials of the company at home and abroad. In doing so he bore testimony to the indefatigable and zealous services rendered by Mr. Saul and Mr. Johns, and said there was not a man in the service of the company whom the directors would be willing to lose. (Cheers.)

A SHAREHOLDER seconded the motion, which was carried.

Mr. CROOKENDEN proposed a cordial vote of thanks to the Chairman and directors.——Mr. TOLPUT seconded the proposition, and it was carried.

The meeting then closed.

CAPE OF GOOD HOPE DIAMOND MINING COMPANY.

The ordinary general meeting of shareholders was held at the offices of the company, Coleman-street, on Wednesday,

Mr. J. A. STEEL in the chair.

Mr. J. A. SHAW (the secretary) read the notice calling the meeting.

The CHAIRMAN said: Gentlemen, the secretary has read to you the notice convening the meeting, and the report and accounts have now been in your hands several days. It may be well if I should mention at once that the notice of the meeting and the report have possibly not come into the hands of each holder of share warrants, as these pass from hand to hand without registration, and the holders are, therefore, unknown to us. We have, however, done our best. Each registered member has, of course, received the notice and the report, and in addition to this we have posted the same to each holder of share warrants whose certificates were presented to us for registration prior to the last meeting held in May, 1882, so that every effort has been made to acquaint the shareholders with this meeting. I will assume, therefore, that all present have received the report and accounts, and I should like to make a few remarks to you with regard to them; and, first, as to the development account. On looking at the credit side you will see that our finds amount to 6578¾ carats; these have been sold at an average of just 30s. per carat. Now in the previous account the average price obtained was 52s. 2d. Had, therefore, the serious fall in diamonds not taken place our finds for the past 13 months, which were of the same quality as formerly, would have realised upwards of 7300*l.* more than they actually have done. It was long suspected that extensive robberies were being perpetrated by those employed in the mines, and recent legislation by the Cape Government, which, amongst other provisions, authorises a power of search, enabled several captures to be made, and brought to light an extensive system of robbery, thus proving that the surmise as to a loss estimated at from 40 to 50 per cent., was but too well founded. It is hoped that the late stringent enactment just referred to, and the very severe punishment passed on offenders will have the desired effect, and that before long the prospects of all honest persons interested will be materially improved. The expenses, as shown in the development account, are no doubt heavy, but we have done our utmost to enforce economy on our managers; and while I think that the cost of production should have been less, still I am bound in justice to say that, taking into consideration the very large quantity hauled, the cost per load does not exceed that of other companies working yellow ground, as given in their printed reports. From the report you will have noticed the exact condition of our claims on Dec. 31 last as compared with that of Feb. 16, 1882, and I think you will better appreciate the very large amount of work which has been done during that period if I mention that on Feb. 16, 1882, our 49 claims were worked to an average depth per claim of 18 ft. only, whereas the average per claim is now 75 ft. You are already aware that work was stopped in December last, as, owing to the continued high prices of labour, fuel, and all expenses incidental to the mining operations, together with the great depreciation in the value of diamonds, it was found impossible to continue the works any longer. Under more favourable conditions, however, we are advised that the property might be worked at a profit; but in view of the proposed amalgamation of the whole of the companies in the Dutoitspan Mine, the directors would strongly point to this as the best means of securing the interests of all those concerned. The only item in the balance-sheet which I will specially call to your attention is No. 2, debts and liabilities of the company, 10,283*l.* 9s. 3d. As will be seen, this consists of an advance on mortgage, 5360*l.*; as to 5000*l.*, of which you were advised in our last report, the remaining 360*l.* has been further advanced to us by some shareholders. The liabilities at Kimberley and in London amount to 2048*l.* 9s. 3d., and consist of 1707*l.* 0s. 8d. due to storekeepers and others at Kimberley for explosives and other articles supplied to the manager, law costs, rates, licenses, &c., the balance, 341*l.* 8s. 7d., being due in London for office rent, and sundry incidental expenses. The amount due to the directors (2875*l.*) for their remuneration appears on both sides of the account, and you will see, therefore, that up to this time the directors' services, which have extended over a period of close on for two years, have been wholly unremunerated. It is part of the scheme for amalgamation that all the existing liabilities of the various companies should be discharged by the new company. Should, however, the amalgamation proposal not be carried through, it will be clear to you, gentlemen, that either fresh capital must be provided, or that the business must come to an end. In the report allusion has been made to an action brought by the Consolidated Company of Dutoitspan to recover damages for the cost of removing a fall of our ground into their claims. We have obtained the best advice available, and shall continue to act strictly in accordance with the recommendations of our legal advisers here and at Kimberley. Our colleague, Mr. Leon Peczenik, is desirous of retiring from the board, as being resident in Paris, he is rarely able to assist at board meetings. At our request, however, he has kindly consented, should you wish it, to retain his seat for another three months, by which time we all hope that the amalgamation scheme will be brought to maturity. I am sorry I am not in a position to recommend to you the names of any gentlemen to take the place of those of our late colleagues who have retired. All I can say is that the board will cordially welcome any two gentlemen duly qualified, whom you may propose at this meeting. Your directors cannot but feel extreme regret that they are obliged to come before you with so unfavourable a statement as to the position of the company. We are ourselves large shareholders in the undertaking, and in addition to the pecuniary loss which we sustain in common with you, we have devoted a great deal of time and attention to the affairs of the company, and have incurred no inconsiderable amount of anxiety in connection therewith. Circumstances over which the directors had no control whatever, and which no ability or foresight of theirs could have averted, have thwarted all their efforts to produce a less unfavourable result. I will now ask my colleague, Mr. Mavrogordato, who has been specially attending to the amalgamation scheme on our behalf, to explain to you the particulars of the scheme, and it now only rests with me formally to propose—"That the report and accounts to March 31 last be received and adopted."——Mr. BARSDORF seconded the motion.

Mr. MAVROGORDATO submitted a scheme for amalgamating the various interests of the Dutoitspan Mine.

Mr. WOOD entered his protest against the scheme as set forth by the mover, because he very much doubted whether it would ever extract the shareholders from their present position. He commented in strong language upon the conduct of some of the previous officers of the company at the mine, at the same time expressing his confidence in the board of direction in London.

Mr. HANKEY submitted that the directors themselves had been as great losers as anybody by the concern, but he quite concurred with Mr. Wood, after their past experience, in believing that it was inexpedient to enter upon any new scheme of the kind suggested. To go into any further commitments would inevitably land them in further liabilities and losses.

Mr. LEVY thought that as the previous speakers condemned the recommendations of Mr. Mavrogordato they might have gone a step further, and told the meeting what their own ideas might be as to the best course to be pursued in order to rescue the company from its present position. (Hear, hear.) He took it from what he had heard that this scheme would not involve the shareholders in any further responsibility whatever, and in the absence of any better suggestion he considered that the shareholders would be acting in their own interests to consent to its being carried out.

Mr. RAALTE expressed his unqualified approval of the proposed amalgamation, because he believed that a larger company could work a mine much more successfully than small ones. If the whole of the interests were under one management and supervision they might yet to a great extent recover their position and losses. It was, as far as he could see, the only means by which they would get their money back again. (Applause.)

Mr. SENDALL wished to know whether any of the adjoining mines were being worked at a profit, and whether there was a reasonable probability if the scheme were carried out the further development of the mine would prove a successful commercial venture. He concluded by expressing his confidence in the present board.

The CHAIRMAN reminded those shareholders who seemed to be dissatisfied with the present aspect of affairs that the company was in a much better position than many others, and pointed out that, having regard to the very speculative nature of all mining enterprises, investors should be prepared for losses and submit to them. He himself had not sold a single share of his holding. The amalgamation scheme would not involve the company in any further liability, and it was probable that it might result in the shareholders getting 30 or 40 per cent. of their capital back again, and possibly the whole of it. The directors did not come before the meeting with a completed scheme of amalgamation. They merely called their attention to it in principle. The question was now being discussed, and at the proper time it would be placed before them in a fully digested condition, when it would be for them to say whether they approved of it or not.

The motion was then put to the meeting and carried, Mr. Wood dissenting.

Mr. MAVROGORDATO remarked that there could be no doubt that many of the shareholders had, in the first instance, put an exaggerated value on the property, there being a perfect mania for diamond mining at the time the company was brought out, and the same remark applied to all other kinds of mining at one time or another. It was a common blunder that the price paid for their claims was too great. But he must confess that one of the reasons why he had confidence in the mine was the moderate price put upon the claims compared with those of other companies floated at that time. If they did not carry out the scheme which he had forshadowed, the question would be put to them, whether it was worth while to put any new capital into the concern. In that case he could only say, speaking personally, and not at all in the name of the board, that it would not be advisable to put fresh money into the mine under the original and existing conditions, because he saw no chance of success even if diamonds rose in value; whereas, by carrying out this scheme, he saw considerable ground for hoping that the shareholders would realise a very fair percentage on their capital.

Mr. LEVY proposed, "That Mr. Mavrogordato having explained to the meeting the particulars of the proposal for the amalgamation of the several interests in the Dutoitspan Mine, this meeting hereby approves of such amalgamation scheme in principle, and the directors are authorised to take such steps as they may think necessary to further the scheme, and to make such modifications as they may think advisable."——Mr. W. H. JONES seconded the motion, which was carried.

Mr. VAN RAALTE proposed the confirmation of Mr. Mavrogordato as a director of the company, which was seconded by Mr. LEVY, and agreed to.

Messrs. J. A. Steel, A. Barsdorf, and L. Peczenik, the retiring directors, were re-elected.

Messrs. Deloitte, Dever, Griffiths, and Co. were re-appointed auditors.

Mr. VAN RAALTE proposed a resolution approving the steps taken by the board to resist the legal proceedings instituted by the Consolidated Company against this company to recover 4283*l.* damages for alleged injury to the claims of the former, in consequence of a serious fall of ground that took place in August last.

The motion was seconded by Mr. LEVY, and carried.

The proceedings closed with a vote of thanks to the Chairman.

VICTORINE GOLD MINING COMPANY.

The adjourned meeting of shareholders was held at the Cannon-street Hotel, on Wednesday,—Mr. ALBERT RICARDO in the chair.

The CHAIRMAN said: Gentlemen, this is an adjourned meeting from last Thursday. We had a certain agreement which we submitted to you, which was to enable us to raise sufficient capital to carry on our mine, and we asked you to confirm that agreement. That proposition was opposed by one or two gentlemen, and it ended, as you will remember, by your appointing a committee of three of yourselves to confer with the lawyers and liquidators, and report what they thought was the best to be done, and whether the agreement was to be confirmed or not at this meeting to-day. The agreement, *in extenso*, I will read if you like; but the gist of it is to raise 30,000*l.* by a first mortgage upon the whole of the property, so as to come before your bonds of 100,000*l.*, but you were to be remunerated, in a sort of way, by having 50,000 shares appended to the 100,000*l.*, so as to have one preference share for every two bonds you held. I will ask the committee to state their views, and whether they recommend you, and upon what conditions, to confirm the arrangement which I have stated to you.

Mr. LOVERING said that at the last meeting himself and two or three other gentlemen were appointed to confer with the lawyers and liquidators as to the formation of a new company, on the basis of getting something from the old company. The only chance he saw was that a new company should be formed, having independent directors, and people who would endeavour, by fair means, to raise 30,000*l.* It was suggested that he himself should go on the direction. He could only say that he would take 30 per cent. of his present holding, so as to keep them within bounds, and not allow the first mortgage bonds to come before them, or leave the men who found the cash out in the cold with 30,000*l.* before them. The Chairman and the other gentlemen associated with him had given a pledge that they would allow the committee to superintend, and be satisfied with the directors. One gentleman proposed was Mr. Pope, Q.C., and two or three gentlemen whose names he would not mention, as they had not yet accepted. Then he hoped Mr. Jenkinson would join the board. It was no use gentlemen joining the board who would not qualify themselves to a fair extent. Until the pledge of the Chairman that he would give them the election of the new board he advised that the agreement be adopted and approved. He would ask Mr. Jenkinson whether he was satisfied with clause 13?

Mr. JENKINSON said he was satisfied if it were understood that if the new board had sufficient over and above the debts they would pay him the sums, or do their best to pay him the sums which he had already paid away. If they had not the money they could not help it, but if they would pay him if they could he would do his best to carry out the agreement. (Hear, hear.)

Mr. SNELL: There is a recital that the open debts amount to about 12,000*l.*, including some debts in America, which it is supposed can be compromised, and in the meantime there will be something to satisfy Mr. Jenkinson. We thought Mr. Jenkinson was not asking anything beyond what he was entitled to ask. A great deal of the money which Mr. Jenkinson seeks to recover was paid away since the liquidation commenced.

The CHAIRMAN: With respect to the conditions which Mr. Lovering has notified to us we are too pleased to accept them, and you shall have the control of naming the directors on the new company. With respect to Mr. Jenkinson, we are quite willing to give the assurance that as far as our legal advice allow, and we are able to do it in the interests of the company, we will repay him such sums as he may be fairly entitled to. Under these circumstances I have nothing more to do but to formally ask you to sanction this agreement. I move—"That the draft agreement submitted to the meeting and initiated by the Chairman be and the same is hereby approved."——The resolution was carried unanimously.

On the motion of Mr. SNELL, seconded by Mr. LOVERING, a vote of thanks was passed to the Chairman, and the meeting broke up.

CANADIAN COPPER AND SULPHUR COMPANY.

An extraordinary general meeting of members was held at the offices of the company, Queen-street-place, Upper Thames-street, on Thursday, to pass the following resolution:—

That the capital of the company, which is now 330,000*l.*, divided into 82,500 shares of 4*l.* each, be reduced to 165,000*l.*, divided into 82,500 shares of 2*l.* each, by writing off from each of the shares now in issue the sum of 2*l.* as capital lost, or not represented by available assets, and reducing the nominal amount of every share not in issue from 4*l.* to 2*l.*

The chair was occupied by Mr. J. W. MACLURE.

Mr. W. G. WILLIAMS (the secretary) read the notice calling the meeting.

The CHAIRMAN said: Gentleman, my duties to-day will be comparatively light, because the matter to be brought before us is one of purely a formal character. In accordance with the wish expressed on several occasions by some of our most influential shareholders, we have determined to take the step of suggesting to you that the capital of the company shall be reduced. The resolution I have to propose is:—"That the capital of the company, which is now 330,000*l.*, divided into 82,500 shares of 4*l.* each, be reduced to 165,000*l.*, divided into 82,500 shares of 2*l.* each, by writing off from each of the shares now in issue the sum of 2*l.* as capital lost, or not represented by available assets, and reducing the nominal amount of every share not in issue from 4*l.* to 2*l.*" As I stated at the general meeting so very fully the position of the company, and referred also to the remarks and attacks which had been made upon the company, I think I need hardly go over the subject again, except to say that we have had a very full report from Capt. Bennetts, which is of the most satisfactory and encouraging kind; and I may add that not only the directors and Messrs. Taylor on this side, but also Capt. Bennetts on the other side, are using every effort to develope the property; and we think that, by this reduction of capital, we shall before long, we trust, be able to give you a perceptible dividend on the capital you have invested. (Hear, hear.) Unfortunately there are some who, like myself, invested a portion of their capital at the original price, being original contributories; but that does not alter the fact that the shares of the company have changed hands to an enormous extent at prices which are more adequately represented by the 2*l.* per share which we now propose to make them than by the original 4*l.* per share. Some have got in at even a lower figure. I counsel those who bought their shares at a nominal price to hold them, and to place that confidence in the property which I believe it amply deserves. (Cheers.) I beg to move the resolution.

Mr. A. J. LAMBERT: I have pleasure in seconding that.

Mr. BRACKSTONE BAKER asked whether the 2*l.* per share would be considered as fully paid up?——The CHAIRMAN: Yes.

Mr. BRACKSTONE BAKER said that as the alteration commended itself to the judgment of the board he should support it.

Mr. WILLIAM ABBOTT: There is another advantage which Mr. Baker has not touched upon. The amount of 40,000*l.* odd to the debit of profit and loss account, which stood as a bar against shareholders receiving any dividend until that amount has been wiped out, has been expunged; therefore, it is an important matter for the shareholders to know that, at the present reduced price of 2*l.* there is nothing standing before them except a small amount of debentures. (Hear, hear.) Therefore, any profit which is made must come to the shareholders, whether it be 2, 3, or 4 per cent., with the great advantage that the debit to profit and loss has been completely wiped out. You could not have received any dividend until 40,000*l.* was wiped off. I was particularly anxious in the interests of the shareholders who came into the company lately, that the obstruction against their dividing any profits should be removed, and that is one object for which the meeting has been called. Whilst addressing you, Sir, I should like to know am I right in supposing that you have still a small amount of debentures unissued? If so, it will be very desirable that the shareholders should know it. (Hear, hear.) They are 8 per cent. debentures; and I think the shareholders, in the present dearth of good investments, should know that the debentures are a first charge upon the capital property of 165,000*l.*; and, therefore, no doubt they will be glad to come in and give you the working capital which just now, I presume, you could employ profitably. (Hear, hear.)

Mr. B. BAKER: That is a very judicious suggestion.

Mr. WM. ABBOTT: The company can employ it profitably.

The CHAIRMAN: The total amount of debentures authorised is 15,000*l.*, and they are repayable at par in about 18 months, so the investment is a good one. (Hear, hear.)

Mr. WM. ABBOTT: If the shareholders knew there were debentures unissued they would take them. What is the balance?——The CHAIRMAN: 1500*l.*

The resolution was then put and carried.

An extraordinary general meeting of members was then held to pass the following resolution as a special resolution, subject to subsequent confirmation:—

"That the Articles of Association of the Canadian Copper and Sulphur Company (Limited) be amended in the following particulars—that is to say,—By striking out from clause 46 the word 'fourteen,' and substituting in lieu thereof the word 'seven.' By striking out clause 68, and substituting in lieu thereof the following:—'68. The office of director shall be vacated.'—(1.) If and whenever he shall be or become the registered holder of shares of the company representing paid-up capital of less than 150*l.*—(2.) If he become bankrupt or insolvent, or present a petition for the liquidation of his affairs, or compound with his creditors.—(3.) If he be declared lunatic or become of unsound mind, or be convicted of felony or misdemeanor.—(4.) If he shall resign the office of director, by giving and leaving seven days' previous notice in writing at the office of the company.—(5.) If he shall absent himself from the meetings of the board without leave from the board for a period exceeding three consecutive months."

The CHAIRMAN formally moved the adoption of the above resolutions, and said it was believed the alterations would tend to promote the better working of the company. One of the most important points was that which made a seat vacant on a director absenting himself more than three months without leave.

Mr. JOSEPH asked the present qualification of a director?——Mr. A. J. LAMBERT: It has always been 150*l.*

A SHAREHOLDER asked what was the quantity of regulus for the last month?

Mr. JOHN TAYLOR said the quanity for March had not been received. For February it was 160 tons, and no doubt for March it was a little more.

Mr. B. BAKER: The prospects of the company are certainly improving.

Mr. JOHN TAYLOR: I think so. The only feature is that the regulus is not quite so good in quality; but we are getting a larger quantity; it has varied before in quality, but the mine is certainly looking very well.

The resolution was then put and carried.

On the motion of Mr. JOSEPH, seconded by Mr. WM. ABBOTT, a vote of thanks was passed to the Chairman.

The CHAIRMAN acknowledged the compliment, and said he was sure the vote was intended to include Mr. A. J. Lambert, who, he was happy to say, was present, with his health much restored.——The meeting then broke up.

SAN PEDRO (CHILI) COPPER MINING COMPANY

An extraordinary general meeting of shareholders was held at the offices of the company, Winchester House, Old Broad-street, on Wednesday, Mr. S. J. WILDE in the chair.

Mr. SYDNEY A. COBBETT (the secretary) read the notice convening the meeting.

The CHAIRMAN: Gentlemen, we have come to the end of our tether as regards money. There is only enough money in Chili, it is estimated, to carry us on till the end of this month, and, therefore, within the next few days we must send out a telegram stating one of two things—that more money is to be found or that the shareholders have agreed to wind-up. Three is the favourite number of alternatives; but I cannot see a third one in this case. We must either find the money or leave the debenture holders, who have a first charge on the property, to do what they like with it. The actual amount of cash we have received has been 16,230*l.* That cash has been spent in this way. In Chili the amount spent has been 9741*l.*—that is, on the shaft and mining proper; on the San Antonio Mine, 230*l.*; to the creditors of the old company, 2724*l.*; and interest on the debentures, 661*l.* The English expenses have been 640*l.* There is a balance of cash in London of 1454*l.*, and in Chili on Dec. 31 of 2086*l.* The latter item is not wholly in cash. It includes a certain amount of machinery and stores. These items extend from the commencement of the company. When the report made up to Aug. 31 was issued there was a balance at the bank in London of 399*l.* odd. There have since been paid on calls 313*l.*, making 713*l.* The payments have been—office expenses to March 8, 109*l.*; wages on men paid in England, 36*l.*; petty cash, auditors' fees, debenture coupons, and Income tax, 107*l.*; leaving a balance at the bank this day of 145*l.* The expenditure at the mines has been as follows:—There was a balance in hand of Sept. 1, 1882, of $20,516, or 2992*l.* The costs to Dec. 31—the latest date to which we have the accounts—has been $9183, leaving a balance of $11,327. Add ores sold and profit on shop $2584, leaving a balance in hand at the end of last year of $13,912, or (say) 2086*l.*, a good deal of which is in stores, and is not actual cash. When this company was started certain things were proposed to be done.

A SHAREHOLDER: When was the company started?——The SECRETARY: In July, 1880.

The CHAIRMAN: It was proposed to re-open the deep main shaft and sink it a further distance of 15 fms., and then to drive a level at that depth. That shaft has been thoroughly repaired from top to bottom. It was found to be in a much worse state than it was expected, because during the two years interval between the time when Capt. Lean visited the mine at the request of the liquidator of the old company, and the time when operations were re-commenced, it had deteriorated very much, and it cost a great deal more money and time in completing it than had been expected. The re-opening of the shaft was a very dangerous work, and it had to be done very slowly, and a great deal of timber had to be used. When the bottom of the shaft was reached, instead of sinking it further it was deemed more expedient and economical to sink a winze on the manto, which they did until they were stopped by the water becoming more than they could manage. Then they commenced to drive a little bit of an elbow level, which they are driving now. That is down 10 fms., so that with the exception of 5 fathoms, we have gone as far as the company proposed; but Nature has not been kind. The company has done its proposed work, with the exception of 5 fms., but unfortunately, as I say, Nature has not been kind to us. The manto is still disordered, and it is a question whether it will be found richer in depth. We can get the water out, and, in fact, it would be far more economical if the shareholders are inclined to find more money, to continue sinking the winze instead of the main shaft. Exactly the same thing is being done at a mine in Cornwall in which I am largely interested, on the same grounds of economy. We could put sufficient pumps in for from 300*l.* to 400*l.*, including the cost of carriage and placing them at the mine. That is, of course, only a rough estimate, and not a contract price; but Mr. Rogers, before he left, consulted a friend of his about it, and I have consulted an independent gentleman, and they both gave estimates coming to much about the same thing, so that there is no doubt it could be done for that price by means of wire-ropes. Though the water is more than they can get out by hand labour compared with the water we have in our mines here it is a mere bagatelle. The pumps would enable them to sink to a greater depth on the manto. The Chairman then read extracts of letters from Captain Lean and Dr. Sieveking, both expressing conviction that a large body of yellow metal must be found at a lower depth.——A SHAREHOLDER: The letters do not mention how much further down.——The CHAIRMAN: No man can tell that. We expected to get it before, but we have been disappointed. Capt. Lean and Dr. Sieveking are strongly of opinion that it is only a question of a few fathoms more or less before you get out of the disturbed ground into the proper manto again. I threw out the suggestion to Capt. Lean some time ago that in case the shareholders were inclined to advance more money, it would back up his opinion if he would undertake to work for half the pay he has been receiving, and he at once consented to do so, hoping that if the mine is successful it should be made up to him, and he is receiving only 300*l.* a year from Jan. 1 of this year. I do not think it would be any use subscribing any more money unless 4000*l.* or 5000*l.* was subscribed. It would simply be throwing money away. You have to provide the machinery, which would cost, say, 400*l.* It would probably take about six months to get it on to the mine, and it would take a little time to erect, and during all that time the establishment charges would be going on just the same. To sink another 10 fathoms would probably take another year, so that we should have to provide for 18 months costs. I think 5000*l.* would enable us to sink that 10 fms., and another 10 fms., making 20 fms. in all. These are the facts, gentlemen, and it is for you to determine what we are to do—whether we are to put our hands into our pockets, or whether we are to pass a resolution to wind-up. It does seem to me, personally speaking, a very great pity, considering the large sum spent in repairing the shaft, the good ore we are in now, and the reasonable hope of finding something good in depth, to let it go, and to throw away all the money without an effort. That is my individual opinion. It is for you to determine what you will do.

A SHAREHOLDER: How many shareholders have we?——The CHAIRMAN: 300, holding 34,000 shares. If you do consent to raise more money it can only be done by the debenture holders allowing us to have a priority for the new capital. With one exception the debenture holders are shareholders. I do not see what the debenture holders can do. They could, of course, take the mine; but it would be a sort of white elephant. They would get nothing out of the mine if they did not put capital into it.

Mr. WALTER CUTBILL: If we go into liquidation what chances have the shareholders of receiving anything?——The CHAIRMAN: Not the slightest chance. There would be a mere bagatelle for the debenture holders.

The SECRETARY, in reply to a question, said there were three other mines on the property, but with the exception of San Antonio, upon which about 200*l.* had been spent, nothing had been done at these mines by this company. They had men on tribute in one of the levels in San Pedro, from which there had been a return of from $300 to $400 a month for the last few months.

Mr. WHYTT thought that if there was any reasonable prospect of getting a return from the mine without any great outlay it would be a great pity to throw the mine away for others to come in and reap the advantage of their outlay.

The CHAIRMAN said if all the shareholders would contribute at the rate of 3s. per share it would provide the capital required; but 4s. per share from the majority of the shareholders would do what was wanted.

Mr. F. F. WILSON was in favour of some such proposition as that being passed. The shareholders could be applied to, and in the meantime negociations could be entered into with the debenture holders with regard to giving the new capital a pre-preference. He believed in the future of San Pedro, and that in a little further sinking the two mantos already discovered would form a junction, and that they would have a great deposit of metal. It would indeed be a great pity for the shareholders to give in without letting the mine have a fair trial. The debenture holders would, he hoped, see the desirability of giving the new capital a pre-preference for dividends, as the mine if taken over by them would be of little value without the spending of more capital.

After some further conversation, Mr. WHYTT moved "That this meeting be adjourned until Tuesday the 24th inst. at one o'clock to enable the directors to issue a circular to the shareholders, and inviting a subscription at the rate of 4s. per share, provided that satisfactory arrangements can be made with the debenture holders to give to the new capital a preference in dividend over the debenture debt, and also provided that not less than 4000*l.* be so subscribed."

Mr. WALTER CUTBILL seconded the motion.

The CHAIRMAN, in reply to a question, said the payments of the 4s. per share could be spread over some time. Probably four equal instalments could be spread over the year, but all the details would be given in the circular.

The motion was carried unanimously, and the meeting then closed.

[For remainder of Meetings see this day's Journal.]

** The TITLE-PAGE and INDEX to VOLUME LII., for the year 1883 was published in the *Mining Journal* of Jan. 20.

NEVADA AS A FIELD FOR BRITISH MINING ENTERPRISE

Although an enormous amount of money has been invested in the mines of the United States by British capitalists the amount returned in the shape of dividends has been comparatively small, but the celebrated Richmond Consolidated has been such a remarkable instance of great and continued success that it is not unreasonable to suppose that a sound company for working Nevada mines would be more readily supported in the English markets than those of most other States in the Union. Relying upon this assumption a company is at present in course of formation for purchasing and developing what is locally known as the Cammack property near Ione, Nye County, Nevada, and which is considered to possess unusual facilities for remunerative enterprise. The reports of those who have inspected the property are undoubtedly encouraging, and as 50,000*l.* or 60,000*l.* is all that is considered necessary for working capital it would appear to be practicable—if the vendors and promoters be reasonable in their demands—to fix the total capital at an amount upon which satisfactory returns might be hoped for. Referring to the property, Mr. W. C. Root, M.E., states that without a doubt it ranks as one of the first on the Pacific slope, and that the remarkable richness of the ores is a fact that should not be lost sight of. He adds that he would call attention to the situation of the mines relative to properties adjacent, and explains that it is in about the centre of the same great mineral belt running north and south, which has produced hundreds of millions of dollars—the Eureka mines on its extreme eastern edge, now producing from 6,000,000*l.* to 7,000,000*l.* annually; yet Mr. Root is by no means alone in the views he entertains.

According to the report of Mr. C. G. Mann, M.E., it appears that the mine and mill property, consists of a 10 stamp mill, with a Corliss steam-engine, four reverberatory furnaces, four amalgamation pans, two settlers, belting, and all the necessary appurtenances to run the mill. There are a brick assay office, assay and smelting oven and other requirements, and a two-storey brick dwelling house. The property occupies about five acres in the lowest part of the town. The water right to a small stream, sufficient for all milling purposes has been bought with the mill, but there is besides a never failing spring on the property. An outlay of from $5000 to $10,000 will put the whole in first-class working order. The mines are located on the westerly slope of the Shoshona range of mountains, at an elevation of 300 ft. to 1000 ft. from the level of Ione Valley, which s about 4500 ft. above the sea level.

On Clipper Hill there are seven lodes from 1 ft. to 5 ft. wide, altogether 7275 ft. These Clipper Hill mines are at an elevation of 260 ft. above the mill, and at a distance of 2000 ft. from it. A shaft 112 ft. deep has been sunk, which when continued to a depth of 200 ft. will unite all these workings by running one level through them to save hoisting machinery and labour. On Lafayette Hill are eight lodes from 3 ft. to 8 ft. wide, altogether 8900 ft., about 4000 ft. from the mill. On Shamrock Hill there are five lodes from 18 in. to 2 ft. wide, altogether 4625 ft.; distance from the mill 6000 ft.

The openings on these lodes range in depth from 50 ft. to 230 ft., and were done at a cost of not less than $50,000. They are easily accessible by good mountain roads. The ore can be brought down to the mill at a cost of $1 to $1 50 cents per ton for hauling, and mined for less than $5 per ton. The ores consist of the various sulphurets and antimonial combination such as ruby silver, stephanite and others, and are embedded in quartz ledges and easily mined. They assay from $70 to $450 per ton. As the deepest of these workings is yet 300 ft. above the water line in these mines they are perfectly dry, and can rapidly be sunk to that point, when they will yield far richer ore. This can already be seen on the narrow ledges on Shamrock Hill, where Mr. Mann obtained specimens from the Argyle and Revenue, assaying $400 to $670. At the proper depth they will come up to the quality of the ores on Lander Hill and Yankee Blade, Canyon, and Austin, ranging from $500 to $1500, and even higher. All these mines are in good order, and will produce ore from the day they are worked. It is estimated that with a capital of from $25,000 to $30,000 judiciously invested, one-half for the improvement of the mill, and the other for deepening and supplying some of the mines with hoisting machinery, a very handsome result and in a very short time can be obtained He considers that 5000 tons of good milling ore could be obtained at a total cost of $150,000, and this at the low rate of $80 bullion would produce $100,000. The Manhattan Company, in Austin, and most of the Virginia City mills with very low-grade ores have done still better. There is ore enough to supply two or more mills from the mines.

This favourable opinion with regard to the value of the mine is fully confirmed by Mr. R. Knapp who reports that the properties consist of three distinct series of lodes, each of which affords ample scope and inducement for consecutive systematic mining, under the best auspices, on a large scale. The lodes of each series are of ordinary width, well defined, of good composition, and unusually prolific in their ore-bearing qualities and character, whilst the containing rock is of that congenial class as to ensure their continuance and permanency of production in depth. The work already done on the several lodes is a sufficient evidence and criterion of what may be expected in the near and distant future, and of what may be relied on from all the salient features, geological, minerological, and experimental. It only remains to prosecute their development to realise immensely large returns in proportion to the necessary outlay. No reasonable doubt can be entertained of the value of the several properties if their development is proceeded with and continued on correct mining principles; they are each and all situate in the heart and centre of one of the richest metalliferous zones hitherto discovered in this rich section of country, at corresponding depths, whilst the indications are that future developments, both longitudinal and downwards, will not only prove the continuance of their productions but increase of values. To ensure the success of such an enterprise it needs only the application of a moderate amount of capital, on lines directed by practical common sense and honesty, to realise returns compensatory to the extent of 50 or more per cent. per annum, approximated to the requisite outlay to furnish machinery and prosecute the developments.

The technical description of the property given by Mr. Isaac M'Connell corresponds in substance with those already referred to. He then remarks that the veins carry all the known rich silver and gold ores. The geological formation is porphyry and syenite; on the footwall there is a heavy clay seam. The facilities for mining and milling are good, both wood and water can be obtained in abundance in the immediate vicinity at little expense. He believes by sinking a shaft on Clipper or Franklin Hill to the depth of 600 ft., it would develope the mother lode, and they would find the lodes carried pay ores in large quantities at that depth. He assumes this because the Alexander Mine, 8 miles south in the same district, has developed an orebody, 485 ft. wide on the 600 ft. level, but he considers the Cammack property (on the same belt) to be superior to the Alexander in quality of ores; for the lodes and mines are persistent fissures and belong to that class in which the ore is concentrated in narrow veins. The mines are so situated that they can easily be connected in underground workings, and advantageously worked in a regular, systematic, and energetic manner would undoubtedly, he thinks, develope one of the best paying properties in Nevada. He found the deepest workings on Franklin Hill; you have an incline down 170 ft. on Clipper Hill—a shaft 112 ft. By continuing these workings down to the 600 ft. level, and then connecting them, and by cross-cuts at the proper points, would show up enough ore to keep the mill and furnace running for at least two years, and would pay the expenses of fitting up the mill, erecting the furnace, and all running expenses, the first 60 days. In conclusion, he states that there is salt in inexhaustible quantities within 50 miles of the property

Of course the reliance to be placed upon these reports largely depends upon the reputation of the reporters; it is, therefore, necessary to state that all the gentlemen named are well known in the United States, and acquainted with the district upon which they report; one of them, Mr. R. Knapp, is an old correspondent of the *Mining Journal*, has had considerable experience both in Cornwall and Wales, and is generally regarded as a sound practical miner, whilst, as evidence of his engineering ability, it is mentioned that he is likely to receive the appointment of United States Surveyor for the district in which the mines—the management of which he expresses his willingness to accept—are situated.

London Time Tables.—It is now so customary to avail oneself of railways when doing business in various parts of the metropolis that the necessity to refer to a time-table arises very frequently. Murray's London Time Tables (published by Boot and Son, Old Bailey) are, therefore, specially worthy of notice, as the tables for any given line having its terminus in London occupy no more space in the pocket than half a dozen ordinary business cards, whilst the volume for the whole of the metropolitan lines is but 4 in. by 2½ in. and rather over ½ in. thick. The tables for each line being printed upon a distinct coloured paper reference can be very readily made, and for clearness, conciseness, and excellence of arrangement nothing remains to be improved.

Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. CCXIV.*

BY J. CLARK JEFFERSON, A.R.S.M., WH. SC.,
Mining Engineer, Wakefield.

(Formerly Student at the Royal Bergakademie, Clausthal.)

GUIDES.

In vertical shafts guides are absolutely necessary only towards the lower ends of the rods, the strain on the upper parts even in the case of wire ropes being so great that there is no tendency to side oscillations. In inclined shafts, and especially in those which have been driven down on the lode, and which have a varying inclination, guides are absolutely necessary. Even in vertical shafts, however, it is usual to provide guides. It is evident that the guides cannot be fixed in any portion of the space traversed by the foot boards. Where the distance of the foot boards apart is only equal to the stroke, the guides can be placed only on the sides and back of the main rods; but where the distance of the foot boards apart is equal to twice the stroke, the guides can be also arranged in front of the main rods. Even where the distance of the foot boards apart is equal to the stroke, the guides can also be placed in front of the rods if the foot boards are omitted in the immediate vicinity of the guides, and the descent over those portions is made by means of ladders. In the first man engine erected by Dörrel, at Clausthal, where every eight or ten foot holds are alternately on one side and then on the other side of the rods, rollers with flanges are used as guides, and are placed alternately on both sides of the rods. In Cornwall, also, rollers 18 to 30 in. in diameter, with flanges 3 in. wide, are used as guides. The most usual arrangement of guides for the Cornish man engines is to provide a cross head or bar of wood considerably wider than, and attached to, the back of the main rods, the edges of which move in grooves formed in long fixed vertical bars, which should be longer than the stroke of the rods, or a board wider than the main rods and longer than the stroke of the rods is fixed to the back of the latter, the edges of which move in short grooves formed in a fixed cross bar. In place of the grooves in the cross bar the edges of the slide board are sometimes made to move between stout L-shaped hooks driven into fixed cross bars. The above slide board is sometimes replaced by slide pieces, about 2 in. by 2 in., to 4 in. by 4 in. in section, and longer than the stroke, which are attached on each side, but close to the back of the rod.

At the Gewalt Colliery, where each main rod consists of two lengths of angle iron, the inner sides of the angle irons are guided in grooves formed in short cast-iron guide brackets, which are bolted to fixed cross bars in the shaft. With main rods of rectangular section, and where the distance of the foot boards apart is equal to twice the stroke, or where one or two foot boards are omitted, the main rods may be guided between pairs of cross bars fixed in the shaft, the pairs being placed at right angles; this is the arrangement of the guides at the Maria shaft, Przibram, where the main rods as already described are formed of four flat iron bars. The two side rods of the man engine erected by Havrez are guided between two projecting ribs on cast-iron plates, bolted to cross bars in the shaft. In order to prevent the main rods from becoming weaker by wearing away, sliding pieces ¼ in. thick are fastened to the side rods by bolts or rivets, with counter sunk heads. The guides are placed at distances of 40 to 50 ft. apart. The guides for the man engine at the Angleur Colliery, where the rods consist of round iron bars, are formed by two vertical bars, one on each side, which are longer than the stroke, and which are fixed to cross bars in the shaft. Two cross bars side by side are clamped by bolts to the main rods just below one of the foot boards, and the ends of each on the inside are cut away just sufficient to leave an opening slightly wider than the vertical guides.

BALANCES.

In the case of double-acting man engines, the weight of one rod balances that of the other as far as the work to be performed is concerned. If no special balances, however, are provided, the upper part of the rods and the motor are strained by the full weight of the rods, which in the case of deep shafts becomes excessive. It is, therefore, usual to introduce a balance at the surface to take this strain off the motor, and other balances at suitable intervals in the shafts to take off the strain on the rods, which can in consequence be made lighter. The introduction of balances serve also to minimise the danger in case of actual breakage of some part of the rods, and the strength of the connections of the rods to the balance arrangements should be calculated with reference to the strain which might be thrown on them by such a breakage.

In the case of single-acting man engines it will be necessary to provide balance weights; with double-acting man engines the one rod may be made to balance the other. The balancing, however, should never be complete; so much of the weight of the rods should be left unbalanced as will readily overcome the frictional and other resistances to the descent of the rods; otherwise an unpleasant side vibration of the rods will be set up. At the surface it is usual to provide a balance lever, with a balance box or weight at one end, to relieve the strain at the upper part of the rods; this arrangement sometimes, though rarely, is met with in the shaft itself; it requires too much room. In the older man engines erected in the Harz Mines the balancing arrangements consisted of a large toothed wheel, the axle of which was supported in bearings carried on fixed supports in the shaft; this wheel is geared with two straight racks, one attached to each of the rods. The wheel was placed between the two rods, with the racks on the inner sides of the rods.

Moissenet improved on the above construction when erecting the man engine at the United Mines, Cornwall. The racks were attached to the back of the rods, the section of the rack frame being L-shaped, so that the racks face each other. The toothed pinion is, therefore, behind the plane of the two rods, and its bearing is formed in one end of a long wooden connecting rod, 16 ft. long, the upper end of which is attached to the short arm of a balance lever, the lengths of whose arms are 6 and 9 ft. The weight (about 4 tons) at the opposite end of the lever must approximately balance the weight of both rods. The advantage of having the support for the pinion axle movable is that the balancing is not affected by any change in the length of the man engine rods, and breakages of the teeth of the wheel and rack are thus less frequent. The use of toothed wheel and rack results in a pressure tending to thrust the racks apart, and enormously increases the friction and wear of the guides; on this account, and the liability to breakage of the teeth, the use of rack and pinion cannot be recommended. The other man engines in Cornwall are provided with ordinary balance levers, the connection to the rods of the man engine being made with very long (60 ft.) connecting rods, which when of wood are fastened to the man engine rods with bolts and clamp plates, the great length and flexibility of the rods allowing of sufficient play for the deviation of the end of the balance lever from the vertical. The most approved arrangement for balancing consists in attaching to each rod one end of a chain, which passes round a pulley supported on bearings in the shaft. The simplest form of such arrangement is found in the Harz Mines, where the balance chain pulley is in the same plane as and between the two rods, the ends of the chains being attached to the insides of the rods. At the Gewalt Colliery, where each main rod consists of two angle irons, these latter are connected together by a cross iron bar, to each end of which the ends of a pair of balance chains are attached, which pass over two pulleys, one fixed on each side of the man engine. The opposite ends of the balance chain are attached to a similar cross bar fastened to the angle irons of the other main rod. The axles of each pulley are in separate fixed bearings, which are supported each on two iron plates placed across the shaft.

The following arrangement is used for balancing the rods at the Maria shaft, Przibram:—Two chain pulleys (one on each side of the man engine) having separate axles are supported in bearings fixed, or cross bearers let into the sides of the shaft. Each bearer consists of two cast-iron girders (I section) bolted together. The inner top and bottom ribs are cut away where necessary for the passage of the

* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergrath Dr. Von Groddeck, Director of the Royal Bergakademie, Clausthal, the Harz, North Germany.

balance chains and the chain pulley, since the centre plane of the chain pulley coincides with the centre plane of the cross bearer. The four ends of the two balance chains terminate in four long bolts, which pass through the ends of two supports attached to and carrying the man engine rods. Each of these supports consists of two flat plates, which are slightly deeper in the centre than at the ends. The man engine rods pass down between these plates, which are connected together by a bolt in the centre which passes through a packing piece between the plates and the rods; similarly a packing piece is placed between the two plates at each end. The ends of the plates and the packing pieces are enclosed in cast-iron muffs, rectangular in cross section. The muffs are provided with vertical side ribs at the inner ends of the muffs, so that the latter serve as guide blocks for the cross supports. The above-mentioned four chain bolts pass through the four muffs, and between the nuts at the end of each bolt and the underside of the muff through which the bolt passes is provided a strong spiral spring. Any slight extension or contraction of the man engine rods or the balance chains is, therefore, at once compensated. The muffs and the man engine rods are secured in position by cotters passing through the flat plates only. Each muff is guided between two vertical bars which are covered over the rubbing surfaces by angle irons. The lower ends of the vertical guides rest upon cross beams in the shaft; the upper ends are connected and enclosed by two wooden bars. The upper ends of the outside vertical bars pass upward between the cast-iron girders carrying the bearings for the axle; these balance arrangements are inserted every 200 ft.

In the balance arrangements designed by Havrez two chain pulleys are provided having a common axle. The inner sides of the pulley rims are turned smooth, and have a circular rib towards the centre, which is also turned on its outer circumference, and thus serves as a guide to the man engine rods. The bearings for the ends of the pulley axles can slide to some extent vertically in cast-iron standards, which are firmly bolted to cross bearers fixed in the shaft. Through each standard two long bolts pass downwards below the cross bearers, and support a common cross plate; on the top of this cross plate is placed a strong spiral spring, and on this rests a second plate, from which a strong bolt passes upwards to and carries at its upper end the sliding bushes or bearings supporting the chain pulley axle; this arrangement compensates for any variation which may take place in the length of either the man engine rods or the balance chains, the weight balanced always corresponding to the force compressing the spiral springs. The foot boards which pass the chain pulley axles must be shortened to allow of their doing so.

In order to prevent the destruction of the man engine and the shaft fittings in case of a breakage of the main rods, safety catches are provided; these usually consist of several strong cross bearers placed one above the other with the ends firmly let into the sides of the shaft. Short projecting blocks are bolted to the main rods, and these come to rest on the above bearers immediately the rods fall a few inches below the position they occupy when at the bottom of the stroke. In the Harz Mines the projecting blocks and catch bearers are placed on two sides of the main rod, and the former are tapered off at the bottom so as to form with the main rod a Y outline. The stoppage is, therefore, more gradual, and there is less risk of the supports giving way.

UTILISING THE HEAT OF MOLTEN SLAG.

The utilisation of the heat contained in slag while in a molten or semi-molten state, for the purpose of calcining or agglomerating the molten or substances with other added substances, so that the after treatment of the combination may be facilitated, has been patented by Mr. G. H. BLENKINSOP, of Swansea. He takes the slag while it is being tapped or run off from the furnace by preference in a thin stream, and with it mixes lime or limestone in small pieces, or in a state of fine division, so that the slag and the limestone shall be perfectly mixed. In order to accomplish this he runs the slag into a suitable vessel, and at the same time causes the fine or broken limestone to mingle with the slag, so that the particles of limestone may be brought into contact with the slag under treatment. By these means the heat contained in the slag or other material is utilised for the purpose of converting the limestone into lime, and for causing the lime to combine with the silica and alumina contained in the slag under treatment, and thus renders easy the extraction of the iron contained in the slag. He also states that by causing this mixture or amalgamation of the slag with the lime or limestone the lime will readily combine with the sulphur, phosphorus, and other deleterious matter contained in the product under treatment, and thus free the iron contained therein from it.

In order to utilise the slag produced from smelting copper, silver, gold, lead, zinc, nickel, or antimony, and which slags have already been allowed to cool, he first smelts such slags in a suitable furnace, by preference in a blast furnace with an ore or material containing copper, silver, gold, lead, cobalt, nickel, antimony, or sulphur, or any or all of these, whereby the metals contained in such slag are profitably extracted, and the slag brought into a suitable condition for carrying out the invention. After the slag has been mixed with the lime or limestone in the manner described, it is treated as an iron ore or product containing iron by any of the known methods.

The novelty which Mr. Blenkinsop claims for the invention is the addition of lime, or limestone, or iron ore, or other suitable material to slag or other products containing iron, while the products are in a molten or semi-molten state, for the purpose of extracting the iron contained therein, and or for the purpose of purifying the same. Also the utilisation of the heat contained in molten or semi-molten substances in the manner described for the purpose of agglomerating together other substances whether in a state of fine division or otherwise such mixture of substances being afterwards treated together for the extraction or otherwise of the metals contained.

CORROSION OF STEEL—SINGULAR CASE.—The attention of Prof. Charles E. Munroe, U.S.N.A., has recently been called to the appearance of two cold chisels found in an American ship, and which have since been preserved in the Department of Steam Engineering at the Naval Academy, and he has communicated his observations upon them to the Franklin Institute. These chisels were taken from the channelway leading from the jet condenser, and they were located between the foot-valve and the air-pump. Both chisels were of steel throughout, as was proved by tempering the head. For use, of course, only the points had been tempered. During the time of exposure to the action of the salt water in the channelway the chisels were deeply corroded; but the corrosion was confined entirely to the soft metal, the tempered points not being attacked in the least. The corrosion was deepest at the line of contact between the tempered points and the untempered metal of the haft. The line of immersion, on tempering, is as distinctly marked as if drawn with a shading pen. Since meeting with these chisels he has heard of a similar case of corrosion, although the object has been lost. It was a hammer which had been taken from the boiler of a merchant steamer, the tempered faces of which were intact while the soft metal was corroded. Remembering the heated discussion going on in metallurgical circles on the question "What is Steel?" he will not attempt to decide whether the change which takes place in the tempering of steel is a chemical or a physical one, but it is evident that this change produces a body which is not so readily acted upon by salt water as untempered steel is. It is also probable that when the untempered and tempered steels are brought into contact in the presence of salt water we have an electro-chemical couple, and that this hastens the destruction of the untempered metal. He suggests that this observation may have a practical bearing upon the construction of steel ships.

GAS MANAGER'S HANDBOOK.—The third edition, that of 1883, of Mr. Newbigging's handsome and practically useful little volume has just been issued, and has been improved in several respects as compared with last year's edition. The omission of the money tables of gas values, discounts, and dividends (though they are printed separately for those who desire them) has reduced the bulk of the volume to that of a convenient pocket-book, without lessening in any degree the value and utility of the work. Many of the notices are really exhaustive little treatises, and afford an enormous amount of information in the most concise form. The Handbook can scarcely be too highly commended

FOREIGN MINING AND METALLURGY

The tone of the Belgian coal trade remains firm, but household coal must be excepted from this remark, as the advance of the spring has naturally materially reduced its consumption. The demand for other descriptions of coal has continued considerable in Belgium. The Marihaye Colliery Company realised last year a net profit of 33,694*l*. The prices realised by the company for coal and coke last year were better than in 1881. As regards the current year the production effected is likely to be equal to that of 1882. Of the products realised last year 24,000*l*. were applied to the payment of a dividend of 1*l*. 12s. per share. The German coal market has remained rather firm. The demand for industrial coal has been good, and household descriptions have also been in some request. At the last dates, however, these latter descriptions had again become weak. Prices have scarcely varied, but in Silesia coalowners have shown some disposition to make concessions to clients. German coal is being forwarded to Switzerland and Italy in rather considerable quantities. In April last year the deliveries to Switzerland amounted to 46,642 tons, in May to 41,566 tons, in June to 40,934 tons, in July to 48,901 tons, in August to 339,735 tons, and in Sept. to 383,260 tons.

Iron has been in no great demand upon the Belgian makets, and transactions have been few in number. Pig has been supported with firmness. There will, however, no doubt arrive a time when the demand for pig will fall off, and quotations must then recede. English pig has made 2*l*. 6s. 6d., while Charleroi pig has been held officially at 2*l*. 18s. per ton. In the Luxembourg pig has been quoted at 2*l*. 10s. per ton; but a recent fall in English pig will probably render the position of the blast-furnaces more difficult, at any rate, for casting pig. Refining Athus-Halanzy pig has been held with much firmness at 2*l*. 6s. per ton. Mixed pig has made 2*l*. 2s. per ton. Iron has been weak at 5*l*. 4s. per ton, while No. 2 has brought 5*l*. 12s. per ton, and No. 3 6*l*. per ton. Girders have been rather better maintained at 5*l*. 12s. per ton. Plates have not been very well supported, No. 2 has scarcely made 7*l*. 4s. per ton; No. 3, 8*l*. per ton; and No. 4, 11*l*. 4s. per ton. At a recent adjudication for wire for Belgian telegraph lines, the Angleur Works submitted the lowest tender for steel wire. The Angleur tender was 15 per cent. lower than the lowest German offer. The John Cockerill Company has just installed at its Maine Colliery a telephone uniting the surface to the interior of the mine. The John Cockerill Company's new steamer, the Archduke Rodolph, has left the Escant for Genoa and Carthagene.

The situation continues to leave something to be desired in France. Employment begins to fall off at the principal forges, and at Paris there has been something of a crisis. Iron has barely supported a quotation of 7*l*. 12s. per ton. The imports of iron minerals into France in the first two months of this year were 239,094 tons, as compared with 214,259 tons in the corresponding period of 1882, and 150,806 tons in the corresponding period of 1881. In the total representing the imports to Feb. 28 this year, Belgian iron minerals figured for 41,943 tons; German for 79,338 tons; Spanish for 47,065 tons; and Algerian for 57,310 tons. The demand for pig and iron of every description has continued considerable in Germany; some important contracts have especially been concluded for railway accessories. Business has also been done upon a rather extensive scale in casting pig, Bessemer pig, and puddling pig. Plates have been generally firm, while wire has also experienced an advance in anticipation of a large increase in the deliveries to north America. The German steelworks are still occupied, although there has been some delay in the letting of contracts for railway *materiel*. In Westphalia, the proprietors of blast-furnaces are no longer disposed to make concessions, as it was thought they were inclined to do some weeks since; some of them now show, on the contrary, a disposition to slightly advance their rates. The total production of pig in the districts of the Sarre and the Moselle in January was 45,721 tons; in February the corresponding production was 44,018 tons. The average monthly production in 1882 was 43,636 tons. Pig has been inactive at Dusseldorf, but there has been rather more activity noticeable in the products of the rolling-mills. An adjudication for rails has just taken place at Strasburg. The Bockum Works secured a contract for steel rails at 7*l*. 12s. 7d. per ton, while the steelworks of the Rhine at Ruhrort took a contract for 6000 tons of fish-plates at 7*l*. 14s. 4d. per ton.

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